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9 JANUARY 1987

Europe/Latin America Report

SCIENCE AND TECHNOLOGY

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EUROPE/LATIN AMERICA REPORT

SCIENCE AND TECHNOLOGY

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COMPUTERS

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WEST EUROPE/MICROELECTRONICS

ICL, THOMSON, SIEMENS JOIN ESPRIT AIDA PROJECT

Milan AUTOMAZIONE E STRUMENTAZIONE in Italian No 9, Sep 86 pp 130-132

[Text] ICL, Thomson, and Siemens will cooperate in a research and development project known as AIDA (Advanced Integrated Circuit Design). AIDA's objective is to develop new design technologies for VLSI circuits with the assistance of CAD [Computer Aided Design] systems. AIDA is certainly the largest scale project ever awarded within the ESPRIT program to date. The total investment in the project is estimated at 33 million ECUs, equally divided among the three companies and the EEC. AIDA's production will require a total of 300 man years over a 4-year period.

The project is intended to produce specific tools for CAD, with a view to adapting to the new possibilities offered by the development of silicon technology. The systems available today on the market are capable of designing chips with a number of transistors varying from 100,000 to a maximum of one million. Within 5 to 10 years, there will be demand for chips with several million transistors; consequently the need to have CAD systems capable of managing programs as a whole will develop at the same pace. The logic elements of these CAD systems will be expensive because of their complexity and size.

For this reason, three different aspects of the program are under study. Siemens, which is coordinating the activities of the research group, will be in charge of the management of layout and instrument control. Thomson will work on logical synthesis and user interface. ICL, for its part, will concentrate its research on the data management sector and on the specifics of the system. System efficiency is also under study. This research will lead to a series of "tools" for a formal structured approach for design of VLSI circuits.

ICL has also recently been put in charge of another ESPRIT project called REQUEST (Reliability and Quality of European Software Technology) intended to study and improve the quality and reliability of software over its working life.

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CSO: 3698/M039

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH CIVILIAN RESEARCH BUDGET CUTS INDICATE PRIORITIES SHIFT

Paris LA TRIBUNE DE L'ECONOMIE in French 4 Oct pp 1, 14

[Article by Andre-Yves Portnoff: "Innovation Is No Longer A Priority"]

[Text] The research budget that the Council of Ministers will examine on Wednesday will not be easy to interpret; its whole presentation has been changed, and even for the experts in the ministries involved, it creates a considerable headache. However, at the council table, one minister will be able to express his satisfaction, and another his relief. Andre Giraud has every reason to congratulate himself on the 5 billion jump in scientific and technological allocations, which, completely spared from the sharp cuts of the springtime collective, have increased by 19 percent to reach 30,750 million francs. The Ministry of Defense now has somewhat greater resources for research, development, and testing than the Ministry of Research and Higher Education!

Alain Devaquet can nevertheless congratulate himself for having done his best to defend the allocations of his ministry, which have gone from 28,470 million to 29,738 million francs (4.45 percent) to almost reach the level of the initial 1986 finance law (30,568 million francs) (-0.3 percent). The large public institutions such as CNRS (National Center for Scientific Research), INRA (National Institute for Agronomic Research), or INSERM (National Institute for Medical Research) would thus partially overcome the restrictions of 17 April; with 8,812 million francs in 1987 instead of 8,146 million this year (+8.2 percent), CNRS will resume its growth in current francs, although in constant francs it will be stagnating at the 1985 level (8,258 million). Public researchers, who feared the worst, are probably not protesting too hard: they will lose jobs, because the 543 positions created will not compensate for the 900 eliminations, but since the latter are administrative or technical, the "pure" researchers will not be scandalized. Nevertheless, this is the first elimination of research positions in four years.

The situation seem to be even more serious when we examine not just the appropriations for the Ministry of Research and Higher Education, but the resources that all the ministries together devote to science and technology, which since the 1982 orientation law have been bundled into one purse labeled the Civilian

Budget for Research and Development; in 1987, this BCRD will grow by only 0.6 percent in current francs compared to the revised 1986 budget. Next year, inflation will thus bring BCRD to 6 percent below its 1985 level, and barely above the level of 1984. The same goes for all civilian expenditures: at 50,581 MF, they will be 5.3 percent higher than those of 1985 (48,080 MF) and therefore 1 percent lower in constant francs.

It is significant that the presentation of the 1987 financing law, on 15 September, ignored the BCRD concept, which since 1982 has been defended as an entity by the Ministry of Research. The Ministry of Finance has of course attempted several times to contest it line by line, but the Ministry of Research retained the possibility of balancing one job against another in case of reductions in the total budget. This is no longer true: each ministry has had to defend its budget by itself, and the "research" line has clearly not always been the one that provoked the hardest fights! The Ministry of Industry has allowed ANVAR's appropriations to be reduced to 726 MF, thus worsening the 400 MF erosion that took place in the spring (746 MF this year, instead of the anticipated 1,146 MF).

The Rue Descartes establishment did not have its say, despite the joint custody of ANVAR by Industry and Research. The minister of research, seriously handicapped by the material and political burden of managing higher education, has thus lost much of his power over the orientation of science and technology. Finance is victorious: it has obtained the de facto suppression of BCRD, thus avoiding any discussion about it as an entity. In the face of challenge, its authority has become such that last spring, almost without any consultation, it was able to amputate the collective's appropriations. Cynically, a staff member of one the ministers involved, explained that in budgetary technique, research was one of the most easily reduced items. Which explains why BCRD has supplied 54 percent of the state budget cutbacks in program authorizations (1,974 MF out of 3,680 MF), and 39 percent of payment appropriation cancellations; the priority which research enjoyed since 1979 is reversed!

Far Off The Mark

Ever since spring, these changes have unfailingly elicited unequivocal reactions from the Higher Council for Research and Technology (CSRT), an advisory organization whose vice-chairman is professor Francois Kourilsky. CSRT immediately alerted Mr Devaquet about the intermediate-term effect of program authorization restrictions, which oddly enough are reduced twice as much as the payment appropriations, and will thus slow down scientific and technical activity in 1987 and 1988, since the programs spread out over several years. The CSRT members, who had already solemnly protested against the restrictions imposed by the Rue de Rivoli organization in 1984 under another government, once more questioned the competence of the Ministry of Economy and Finance to evaluate research and its content, instead of the qualified ministries! This is a question which clearly transcends political boundaries.

Research and development budget

(A) INFLATION CONSIDEREE		4%		2,2%
	1985	1986		1987
		(B) Initial	(C) Après collectif	
Ministère de la Recherche et de l'Enseignement supérieur				
— Section recherche		21.938	19.840	21.040
(C) Section universités		8.630	8.630	8.698
TOTAL		30.568	28.470	29.738
CEA (dotations industrie + EDF) (D)		4.016	3.864	3.911
Ministère des P et T				
— Recherche télécom		3.834	3.834	3.848
— Filières électroniques (E)		2.865	2.380	2.543
— CNES		4.210	4.210	4.376
Aéronautique civile (F)		2.662	2.662	2.192
CERN et ministère des Affaires étrangères (G)		770	770	696
ANVAR (H)		1.146	746	726
Ministère de l'Equipement, du Logement, de l'Aménagement du territoire et des Transports (I)		653	627	586
Autres dotations « recherche » des ministères (J)		935	867	865
Crédit d'impôt recherche (estimation) (K)		1.000	1.000	1.100
TOTAL CIVIL	48.080	52.659	49.430	50.581
Ministère de la Défense nationale (L)	23.620	25.788	25.780	30.750
TOTAL EN FRANCS COURANTS (M)	71.700	78.447	75.210	81.331
Evolution du budget civil de R et D (BCRD) indice 100 en 1982, en francs constants (N)	123	128	118	116

Key:
(A) Inflation considered
(B) Initial (C) After collective
(C) Ministry of Research and Higher Education
Research sector
University sector
(D) AEC (industry endowments + EDF)
(E) Ministry of P and T
Telecommunications research
Electronics industry
CNES
(F) Civilian aeronautics
(G) CERN and the Ministry of Foreign Affairs
(H) ANVAR
(I) Ministry for Equipment, Housing, Land Management, and Transportation
(J) Other ministry "research" endowments
(K) Research tax credits (estimated)
(L) Ministry of National Defense
(M) Current francs total
(N) Changes in the civilian research and development budget (BCRD) index 100 in 1982, in constant francs

CSRT's reaction was particularly strong because the distribution of cancellations goes completely against the priorities that it has proposed for years. Quantitatively, the objective formulated in 1979, and especially since 1982, to bring France "among the leading developed countries in research and development achievements," is becoming increasingly remote, insofar as the national expenditures allocated to this category have decreased in 1985 and 1986, and as industry has certainly not been able to fill the gap left by the government.

In a more qualitative sense, CSRT has repeatedly emphasized three requirements: bolster industrial research, rebalance it, and strengthen scientific employment. Mr Kourilsky points out the human deficit in French research: "There are 3.7 researchers or engineers per thousand people in France, compared to 4.7 in FRG, 6.2 in the United States, and 6.5 in Japan. And French industry is even further behind its competitors." This situation reflects a disgracefully inadequate industrial research effort. There are exacerbating and actually interconnected circumstances: business participates less than it does in other countries in an industrial research effort, 56 percent of which is financed by the government in France. And 82 percent of this public support is focused on two branches: aeronautics (50 percent) and electronics (32 percent). If we also include the nuclear spending effort and the 4 billion received by the AEC, we see that very few resources, about 2 billion, remain for what Mr Kourilsky calls "diffuse research." As a result of the large military or civilian programs, which for historical reasons are much more important in France than in the two defeated countries of the last war, public allocations support 52 percent of the research of aeronautical companies and only 4 percent of agricultural-food manufacturers. Thus, contrary to the myths common in France's liberal claims, the government finances twice as much research in mechanical construction, and six times as much basic metallurgical research, on the other side of the Rhine than it does in France.

This is the context in which all inducement appropriations have just been very strongly reduced. The Ministry of Research in particular, has access to a Fund for Research and Technology (FRT); this fund, which in 1985 amounted to 1,170 MF and which in 1986 was to receive 1,072 MF, was summarily cut in half on 17 April; in 1987 it would amount to only 750 MF, with part of it going to Eureka. But the FRT allows the Ministry of Research to finance a number of "mobilizing" or "priority" programs which combine the efforts of public and private laboratories on important topics such as biotechnology, computer-aided manufacturing, or materials. It thus encourages the necessary cooperation between universities and industry; 70 percent of these appropriations go to enterprises, rather than one-third, as reported by an apparently poorly informed Rue de Rivoli. In April, these appropriations, scattered among some twenty headings, were shrunk in some cases by more than 70 percent--as in the case of computer-aided manufacturing--or 90 percent--for oceanography--which is tantamount to a cancellation.

Upstream of these research actions is the aid to innovation which ANVAR distributed to enterprises to carry out industrial developments. The 987 MF of budget support for 1986 became 570 MF in April, and negotiation by negotiation, the next budget proposes 570 MF. In fact, thanks to some leftovers and especially to repayments from companies which in the past have received aid and which have succeeded in marketing their innovations, ANVAR will still be able to distribute 830 MF this year and nearly 900 MF next year, but the drop still remains significant with respect to 1985 (1,117 MF distributed, 906 MF coming from the budget).

Leverage Effects

This shutdown in innovation aid is justified by two arguments: the large enterprises do not need these loans, and it is better to resort to indirect aid, easing the loads on enterprises.

The first argument is weak, since 61 percent of the innovation aid in 1985 went to PME (small and medium-size enterprises) of less than 500 employees, and 84.6 percent to those with less than 2000 employees. The second argument overlooks the small number of scientific and technical personnel on the staffs of most French enterprises, a shortcoming only recently mentioned in an OECD report; in the absence of specific aid, the resources released are used for everything else but for developing research and innovation. The capability of scientific directors to involve their enterprises in a research or development program is reinforced when they can rely on public financing through FRT or ANVAR, which also constitutes a sort of guarantee for the scientific community. For PME, aid to innovation becomes a clear label often successfully exploited with regional bankers, who are glad to benefit through ANVAR from a technical expertise which they lack.

These considerations of principle are confirmed by the facts. The support repayments to ANVAR--23 MF in 1982, 149 MF in 1985, and more than 200 MF next year--appear to mean that the supported businesses were generally well selected, and that they created both revenues and jobs. According to ANVAR, each franc of support generates 10 francs of annual revenues. The job effect can be assessed from a survey conducted by SCIENCES & TECHNIQUES and the Banques Populaires, among 880 PME that had innovated during the preceding five years: 3000 jobs had been generated, and 4000 consolidated; a large portion of the latter would have been lost without innovation. This indicates that Finance has made a bad choice by cutting aid which would have been partially reimbursed. The immediate savings will be cancelled by the loss of fiscal receipts, new jobs, and by the creation of additional unemployment which will have to be compensated.

Death of FIM

The budget restrictions felt by research and technology are further worsened by the suppression, last 1 August, of the Industrial Modernization Fund (FIM), which had two attractions: it was distributed by ANVAR according to technological criteria with no requirement of financial guarantees, and it offered

loans at 8.75 percent, while the Codevi from which it drew its funds were repaid at 6 percent. FIM was killed in two stages. First of all it was maintained at 8.75 percent while the Codevi dropped to 4.5 percent and the cost of money got cheaper: it was thus noted that it had become expensive and therefore unnecessary, hence its elimination. Contrary to what was stated, bank loans to enterprises (PBE) reserved for PME are not a substitute for FIM because the PBE procedure has no technological specificity, and because the banks which issue these loans have neither the means nor the desire to assume risks in areas in which they sadly lack expertise.

The death of FIM, which provided PME with about one-half billion francs of investments in technical equipment and services, is a clear example of the pressure exerted by the financial establishment and especially by Rue de Rivoli, which has never accepted this method of financing over which it had no control. Venture capital specialists already deplore the disappearance of FIM, which facilitated many deals and made it possible for them to avoid excessive risks.

If the budget draft is adopted, all these measures will strengthen the position of the large programs which especially benefit various large companies at the expense of technological progress in PME and the so-called conventional sectors, such as automobile, machinery, textiles, agricultural foods, all of which are cruelly short of technological efforts and provide a large portion of national employment. This is not the orientation which will strengthen the international competitiveness of French enterprises, nor our foreign trade, essentially weakened by slow modernization. Nothing makes it possible to temper this diagnosis by stating that the spinoffs of the rising military appropriations, whose distribution is still unknown, will be so large that they will compensate for the cutbacks in civilian allocations.

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CSO: 3698/73

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

EEC STATEMENT ON ESPRIT, BRITE, RACE, EUREKA

Brussels EEC INFORMATION MEMO in English No P-91 Nov 86 pp 1-4

[Article: "Links with EUREKA and Evaluation of RTD Programmes: Two Important Horizontal Aspects of the European Technology Community"]

[Text] The European Commission has just adopted two communications to the Council in which it spells out, firstly, how it sees the links between Community RTD programmes and EUREKA projects and, secondly, how it intends to enlarge and strengthen the continuing internal and external evaluation of Community research and technological (RTD) activities.

Both communications are steps in the natural evolution of Commission initiatives with a view to strengthening the technological base and competitiveness of Community industry and take on particular importance in the light of the Commission's proposal for a multiannual Community framework programme for research and technological development (1987-1991), expected to be adopted by the Research Council on 9 December next.

The Commission has also adopted a decision aimed at a decisive improvement and speeding up of the processing of applications and payments in the context of its RTD programmes.

Eureka and the Framework Programme: "Who Does What?"

The European Council in Milan in June 1985 decided to implement a European Technology Community and at the same time gave its support to the EUREKA initiative.

Having supported the EUREKA initiative from the start, the Commission wants to indicate clearly to industrialists and scientists the respective roles of activities undertaken by the Community in the framework of its RTD policy and EUREKA projects. The communication also spells out concrete ways in which the Commission intends to support EUREKA projects which, like Community action, contribute to the strengthening of the technological base as well as the industrial competitiveness of Europe.

Community RTD activities are situated further upstream from the market than are EUREKA projects, the latter being aimed at strengthening cooperation between European companies with a view to developing new processes, products or services.

The Community programmes are mainly focusing on basic research (Fusion), precompetitive and prenormative research (ESPRIT, BRITE, RACE, materials, raw materials), and finally on stimulating scientific creativity by encouraging cooperation between scientists (Research Workers' Europe).

In practice, Commission support for EUREKA will therefore fall within the framework of the institutional mechanisms, Community objectives and policies and, in particular, the creation of the large market by 1992, and will take the following forms (some of these mechanisms have already been implemented):

Participation in EUREKA Projects

- carrying out of EUREKA projects or certain phases of projects, particularly those which are of a prenormative nature. Commission participation in these EUREKA projects will depend upon their compatibility with Community rules of intervention in the field of RTD as laid down in the framework programme 1987-1991. This participation will receive budgetary support which will have to be decided case by case in accordance with the Community rules of intervention:

- contribution from Community financial instruments and Commission proposals in the field of financial engineering towards the financing of EUREKA projects:

Environment for Technological and Industrial Cooperation in Europe and Its Promotion

- organizing industrial fora to identify the objectives and the content of new actions in the area of technological and industrial cooperation which may be carried out either in a Community or a EUREKA framework;

- setting up concertation between participants in certain EUREKA projects and other parties involved such as manufacturers and users of new technologies. Example: High definition television.

- supporting the definition as well as the harmonized implementation of common standards resulting from work under EUREKA or indispensable for the technical and commercial success of a project carried out in this framework; a specific concertation between the Commission and EUREKA bodies could be organized to this end;

- constructive applicaton of the rules of the Treaty concerning competition or state aid to research and development to EUREKA projects as to other technological and industrial collaborative projects in Europe.

Participation in the EUREKA Secretariat

- secondment of a Commission official to the secretariat;

- financial contribution towards the budget of the secretariat;

- making transnational data bases and information networks available to EUREKA.

Strengthened Evaluation of Community RTD Programmes

Although Community R&D spending only represent about 2% of national R&D expenditure in the twelve Member States, the Commission is conscious of the fact that Community RTD programmes will always have to undergo a closer scrutiny than do national programmes, that is by twelve governments, by twelve parliaments, etc. The fact that the Community programmes entail spending of public money means that they must stand up to an evaluation of how effectively they are managed, how they fulfil their objectives, and their relevance at any given moment.

This is why the Commission since 1978 has pioneered regular evaluation of its programmes - partly by groups of independent experts - as an integral part of the management of these programmes.

The new plan of action relating to the evaluation of Community research and development activities for the years 1987 to 1991 must be seen in the light of the proposal for a second framework programme which represents a qualitative jump in Community RTD, hence the need to extend and strengthen the activities under the previous plan (1983-1985). So far, 18 different programmes have been evaluated by groups of independent experts, and the results have had a decisive influence on the carrying out of current programmes and the definition of new ones.

Based on a formula which has already proven itself, the new plan of action is two-pronged, i.e. it comprises internal evaluation carried out by the Commission services with the assistance of a number of advisory bodies and external evaluation entrusted to panels of independent experts or consultants from the outside, whose neutrality guarantees the credibility of the process.

These external evaluations will, based on methods which are adapted to the different programmes under scrutiny (hearings, questionnaires, etc.), address numerous aspects of the research activities: scientific and technical achievements of the programme; quality and practical relevance of the results (including whenever relevant commercial aspects); effectiveness of the management and of the use of resources; the programme's or activity's contribution to the development of Community policies and to the social and economic development of the Community as a whole, etc. Wherever possible, these evaluations will be based on quantitative indicators.

It is becoming increasingly clear that evaluation represents a key element in R&D management, and the Commission intends to continue to take the lead in this field.

Consequently it plans to propose to the Council, once the framework programme has been adopted, a research programme which would cover studies aimed at improving the existing evaluation methodologies and developing new ones.

The Commission would also, through this programme, endeavour to establish a network connecting its services with the national evaluation bodies, so ensuring that the most efficient methodologies could be disseminated.

As previously mentioned, evaluation will be an integral part of all Community R&D programmes, this research programme on methodologies would therefore include evaluation of the evaluation.

CSO: 3698/A072-E

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

CNR PRESIDENT OUTLINES ACCOMPLISHMENTS, GOALS AT NATIONAL MEETING

Rome COMUNICATO STAMPA in Italian 29 Sep 86 pp 1-4

["Summary" of speech by CNR President Luigi Rossi-Bernardi at the general meeting of CNR national consultative committees in Naples on 29 September]

[Text] "This has been a good year in terms of initiatives, progress, and positive results for Italian science," Professor Luigi Rossi-Bernardi, president of the National Research Council (CNR), said as he presented the annual report on the state of science and technological research in Italy at the general meeting of the CNR's national consultative committees.

The meeting was held for the first time in Naples, with the participation of the Minister for Scientific and Technological Research, Senator Luigi Granelli, the Minister for Education, Senator Franca Falcucci, the Minister of the Fund for the South, Senator Salverino De Vito, and the new Minister for the Environment, Professor Franco De Lorenzo. Also present were a large group of parliamentarians, university presidents, presidents of the southern regional governments, professors, and researchers.

With reference to the positive results obtained, Rossi-Bernardi began by mentioning the Nobel prize for economics conferred this year on Professor Franco Modigliani, who is of Italian origin. Rossi-Bernardi went on to emphasize the increase of more than 13 percent (between 1983 and 1985) in the number of scientific articles published by Italian researchers in the best international publications. This showing means that our country has risen in two years from 12th to 8th place among the scientifically most advanced countries. He also mentioned a host of other activities: the exceptionally positive development of scientific research at the Gran Sasso laboratory; the establishment of the International Institute for Biotechnology in Trieste; the first Italian scientific expedition to Antarctica; the termination of the design phase of the synchrotron laboratory in Trieste; the opening of the Academy for the Third World; the beginning of RFX fusion experiments in Padua; the development of the Geo-Travers project aimed at opening new horizons for understanding tectonics in Italy; the beginning of the large international earth sciences project; the Ocean Drilling Program, to which Italy has made significant contributions; and the expert scientific and cultural support provided by the Italian scientific community in many other projects of world renown.

The estimated expenses for the entire Italian scientific and technological research sector have gone from 9.245 trillion lire forecast for 1985 to 11.173 forecast for 1986. This represents an increase of approximately 20 percent in current money and 14 percent in real terms.

The ratio between research activity expenses and gross national product is forecast to reach 1.46 percent in 1986 for the first time in the history of our country. This will occur after a long period of stagnation.

The funds intended to finance research activity in the country lead us to be more optimistic than in the past about the development prospects in this sector, even though the figures are still far from the level of financing available for research and development in more advanced countries.

There are an estimated 112,884 scientific personnel engaged in research (expressed in full time equivalents) in 1986, 61,979 of whom are researchers, 30,480 technicians, and 20,425 in other categories. Overall funding will grow this year to an average value of 130 million lire per capita, which is the same size as more advanced countries. It is forecast that 1986 research appropriations will be allocated more or less evenly between public organizations and government and private enterprises. In the public sector, the Ministry of Education comes first with 32 percent, followed by ENEA (20 percent), CNR (17 percent), defense (10 percent), the Fund for the South (6 percent), the Institute for Nuclear Physics (4 percent), and others. The most highly financed areas of research are technological research (19 percent), nuclear research (12 percent), physics (12 percent), biological and medical research (11 percent), social sciences (9 percent), space research (7 percent), agriculture (6 percent), and chemistry (5 percent).

The breakdown of total public and private sector research funding among basic research (17 percent), applied research (40 percent), and developmental research (42 percent), indicates that a significant and considerable amount of resources in our country is devoted to basic scientific research, free of all strings, preconceived ideas, and hidden agendas.

The Italian scientific community largely agrees, the CNR president affirmed, on the objectives to be pursued in order to strengthen the Italian scientific system. These goals were elaborated in the committee presided over by Professor Dadda, which recently submitted its report to the prime minister.

The objectives most commonly agreed upon are the following:

1) to provide the Italian scientific community with a minister of research who has effective coordinating and management powers in the scientific field;

2) to increase the number of young researchers and technicians working in the field (by 50,000 over the next 5 years);

3) to increase the funding for basic and applied research, concentrating resources in well defined sectors or "islands of excellence" critical to the country's development;

4) to increase the research commitment of companies and individuals by strengthening the incentives offered;

5) to restructure the funding regulations for research of Italian public bodies;

6) to give research personnel a new professional status and to pay them competitively in the Italian labor market.

At a time when the improvement in the Italian economy allows us to foresee the possibility of new investment, Professor Rossi-Bernardi said, it becomes possible to hope for more and better investment in the only raw material available in great abundance in our country--brainpower.

At present, the only factors holding back the development of our scientific system are the insufficient number of qualified researchers working in sectors strategic to the future of our country and the lack of appropriate scientific buildings and structures.

To overcome these factors, we need to develop a strategy that will concentrate our institutes in research areas that are adequately equipped and of an appropriate size. We also need to offer adequate economic incentives to the personnel working in the research institutes.

Let us not forget that very interesting and useful research findings in sectors such as genetics, advanced technology, and energy production are near at hand, Professor Rossi-Bernardi said. The practical uses to which these achievements will be put will be reserved for the countries which have invested in these sectors in a timely way.

The concluding section of the president's address was devoted to a detailed analysis of the scientific research activities being carried out in southern Italy.

The development of southern Italy cannot be carried out by strengthening a productive infrastructure concentrated in heavy basic industry. Development depends on the ability to be receptive to new technologies and new productive and organizational methods and to be able to adapt these new techniques to the existing production infrastructure. Thus, at the present time, southern Italy is facing the problem of finding the correct relationship between socioeconomic development and scientific and technological research activity.

In order to highlight the present state of inferiority of the southern scientific and technological system, (even though the area has a glorious cultural heritage and islands of notable scientific production) Rossi-Bernardi presented the first complete data bank of the scientific and research activities of the southern regions based on CNR field research, containing information on the features of 1,021 institutes, university departments, CNR institutes and centers, research organizations of ministries and regions, and research consortia of public and private bodies.

For each research center, there are noted not only the most important

organizational information, such as a description of each organization and the number of researchers and technicians it has, but also information on research underway, on cooperative arrangements with other Italian or foreign institutions, and on the scientific productivity of the organization's researchers.

From the data presented, the CNR president drew some preliminary conclusions for an overall evaluation of scientific research in southern Italy and of the appropriateness of the resources available in this sector to sustain the cultural, scientific, and productive growth of the southern regions.

1) There are approximately 9,000 full time equivalent personnel engaged in scientific and technological research in the south; this represents approximately 8 percent of the national total.

2) 90 percent of these persons work for the public administration sector, broken down into universities (77 percent), CNR (9.2 percent), and other bodies.

3) Personnel engaged in R&D activities relating to public and private enterprises constitute approximately 5 percent of the total; this may be compared with 50 percent at the national level.

4) The scientific productivity of R&D personnel in the south is equivalent to the national average, if the number of works published in international scientific journals is used as an indicator. The funds available for research activities per capita for each technician and researcher, excluding salaries and maintenance expenses, is estimated to be 15 million lire. This is equal to the best international standards.

5) The number of patents awarded scientific personnel working in the south is approximately 1 percent of the national total.

6) The predominant scientific research activity in the south is largely basic research. The goals of this activity, with a few exceptions, are spread out and are not directly related to an identifiable design aimed at strategic or priority areas.

7) The number of researchers, research projects, scientific publications, and scientific institutions in six sectors considered to be priority areas by the European Community ranges, according to the index used, from 7 percent to 15 percent of the total.

8) The number of Phd courses for the entire South is approximately 20 percent of the national total. In particular, the number of doctoral courses in the six strategic areas of development represent approximately 37 percent of the overall number of doctoral courses being offered in the southern regions. Between 90 and 140 students are estimated to be in the priority development doctoral course areas.

9) The number of researchers being trained or who will be trained in the next few years on the basis of program No. 35 of the Fund for the South consists of

573 people in the water, agricultural, and industrial sectors.

10) The number of researchers necessary to reach the target goal of 40 percent of the national total is estimated to be 17,900 new personnel in the government sector.

This information, Rossi-Bernardi said, shows us better than mere words the formidable problems which must be overcome to achieve the objective of using 40 percent of public research funds in the South. In conclusion, he mentioned the programs proposed by the CNR to the Minister For the Fund for the South, Senator De Vito, to reestablish balance in the level of CNR scientific activities in southern Italy. This balance will not come about unless a substantial number of young Italians from the South are brought into the educational circuit of the research sector and unless appropriate research structures are provided for them to use.

The CNR president's detailed report also discussed the proposed reform of the CNR. The presentation of these reform proposals by the Minister of Scientific and Technological Research Senator Granelli will take place soon.

"I speak for the unanimous position of our researchers, technicians, and administrators," Rossi-Bernardi said, "when I say that I hope for a modern reform proposal, which will be at a high level and meaningful for the scientific world. I hope for this so that our scientific community, while preserving the precious human, cultural, and scientific heritage present in the CNR, may carry out the changes which will permit Italy's most important research body to continue to contribute to the progress and freedom of science and to serve the interests of our country."

8615
CSO: 3698/M051

WEST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

ITALIAN MINISTRIES PLAN SOUTHERN RESEARCH DEVELOPMENT

Rome COMUNICATO STAMPA CONGIUNTO in Italian 30 Sep 86 pp 1-2

["Joint Press Release of the Minister for Scientific Research, the Minister for the Fund for the South, and the National Research Council (CNR)"]

[Text] The Minister for the Fund for the South, Senator Salverino De Vito, the Minister for Scientific and Technological Research, Senator Luigi Granelli, and the President of the National Research Council (CNR), Professor Luigi Rossi-Bernardi, have announced an agreement to synchronize investment programs between the CNR's 3-year plan for 1987-89 and the 1986-88 program for special investments in the Mezzogiorno provided for by law No. 64 relating to investment in the south. The rationale for this concentration of efforts and resources lies in the unbalanced state of the scientific network in the Mezzogiorno; with respect to the private industrial component of this network, it is almost nonexistent (only 2 percent of private industrial research is conducted in the Mezzogiorno).

The agreement aims to:

1. encourage the development of scientific structures in the south;

2. stimulate the interaction of these structures with the industrial world in order to increase their competitiveness;

3. encourage employment opportunities, both directly, through an increase in CNR staff size, and indirectly, through development assistance.

The agreement represents an integration of the development plans of the CNR. It spells out a complex strategy of mutual reinforcement based on the following working principles: reinforcement of the research structure of the CNR in the south; well articulated and program-oriented development of cooperation between the CNR and southern universities; and promotion of close cooperative links with the industrial and service sectors.

The priority areas in the agreement are the same as those indicated by the 3-year development program of the southern region. The priority areas include agricultural and food technology, biotechnology, computer technology,

archaeology, development and conservation of the area's artistic and cultural heritage, and the study of the southern region's economy.

The development objectives indentified will be pursued in the areas indicated above through a variety of strategically placed investments in areas where significant and definite results may become evident in the next 2 years. In particular, the plan envisages:

--investment in already existing CNR bodies with the aim of strengthening their structures, finances, and personnel;

--development of new research bodies in sectors which lack or are seriously deficient in resources with a view to carrying out concerted research programs. If necessary to speed up the process, the establishment of the services of CNR bodies already working in other regions is envisaged. This will be done to develop appropriate working groups as soon as possible;

--personnel development, which will be designed to train personnel for CNR bodies and also for assimilation into the economy, given the level of expertise acquired in the production and service sectors. This development will be carried out through the network of 268 CNR centers and institutes operating throughout Italy, universities, Italian and foreign research bodies, as well as through the yet to be formed National Center for Personnel Development in Palermo. For the development of graduate research personnel, the possibility of extending the number of graduating students in research areas will be explored to the greatest degree possible through appropriate agreements between the CNR and the Department of Education;

--the establishment of research areas in various southern sites where various initiatives and large scientific structures of national and international interest will be concentrated;

--the promotion of research activities by encouraging contracts and subsidies deriving from various CNR projects as well as from the normal budget; and the establishment, in close collaboration with the southern universities, of strategic scientific and technological research projects with direct impact on the southern region;

The program agreed upon is intended to achieve the following quantitative objectives by 1991:

--to increase the percentage of government financed research in the South from the present level of 18 percent to 40 percent;

--to increase CNR's research personnel from the current number of 850 to 2500.

For the next 3-year period, the program envisages expenditures of approximately 800 billion lire which will be appropriated through the joint efforts of the CNR and the special investment program.

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CSO: 3698/M050

BRIEFS

EC PROPOSING NEARLY 8 MILLION ECU FOR R&D--On 19 November the European Parliament's Committee on Energy, Research and Technology unanimously approved the Commission's proposal for a Community framework programme in the field of research and technological development from 1987-1991, paving the way for the concluding plenary debate on 8 December. Commission Vice-President Mr K.H. Narjes regarded the parliamentary committee's decision, prepared by Mr Saelzer, Member of the European Parliament, as an important signal for the further discussions of the Council of Ministers. "I very much welcome the parliamentary committee's unanimous approval of the framework programme. The united approach of the Commission and Parliament and the positive response shown by the European industrial and trade associations to the framework programme should give food for thought to the governments of those Member States which still have reservations. To them I would say again: without a quantum leap forward in European scientific and technological cooperation, without the European Research and Technology Community and without the access to high technology which this makes possible for everyone, there will be no common internal market and no opening up of public procurement." The Commission's proposal provides for expenditure amounting to 7 735 million ECU, spread over five years, for promoting research and technological development in the Community. Reservations about the financing of the programme have been expressed by three Member States, which have a strong scientific and technological infrastructure of their own and whose combined national research and development expenditure makes up some 80% of the total research budgets of all 12 EEC Member States. [Text] [Brussels EEC PRESS RELEASE No IP(86) 546 in English 21 Nov 86]

CSO: 3698/A073-E

EAST EUROPE/AEROSPACE

ACTIVITIES OF INTERCOSMOS IN 1985-1986

Prague TELEKOMUNIKACE in Czech No 10, Oct 86 pp 155-156

[Report by Engineer Zdenek Voparil of the Federal Ministry of Communications, and Engineer Ivo Stepanek of the Communications Research Institute: "Intercosmos in 1985-1986"]

[Text] In the period between the 1985 and 1986 annual meetings, already the 1986-1990 work schedule governed the activities of the Intercosmos Program's Permanent Working Group for Space Communications (SPS-KS). The research and experimentation during the current five-year period is divided into six topics, always coordinated by one of the countries participating in the program.

Within the individual topics, the main results of research and experimentation during the period just ended are as follows:

Topic 1. "Development of new frequency bands. The design of experimental satellite communications systems in the 10- to 30-GHz bands." ([Place and date of coordination meeting:] Frankfurt an der Oder, April 1986. Coordinator: the German Democratic Republic. Participating countries: Bulgaria, Hungary, Poland, the Soviet Union, and Czechoslovakia.)

Main attention was focused on investigating radio-wave propagation in the 10- to 30-GHz bands, and on further equipping and expanding the "Dubna-0" international test range in the Soviet Union and the national measuring stations. Czechoslovakia lent the international test range in the Soviet Union two class II ground stations (one retrofitted with a Soviet transmitter) that were used to study radio-wave propagation and for transmission experiments as well. At the Czechoslovak measuring station, an automatic system for data acquisition and recording was placed in operation, positioning of the ground receiving antenna was developed, and radio-wave attenuation was measured in an experimental terrestrial radio relay link at 11 GHz.

Topic 2. "Research of optimal methods for processing and transmitting signals, and of new optimal methods for satellite multiple-access communications systems." (Budapest, April 1986. Coordinator: Hungary. Participating countries: Bulgaria, the German Democratic Republic, Poland, the Soviet Union, and Czechoslovakia.)

Attention focused especially on researching the optimal methods of signal transmission in satellite communications systems, using state-of-the-art technology. Czechoslovakia contributed theoretical research into the satellite transmission channel's digital modeling, and experimental research into the joint transmission of a video signal and two accompanying audio signals, over a channel 27 MHz wide.

Topic 3. "The elaboration of principles for the design and implementation of satellite communications systems and networks, including the use of narrow beams and on-board signal processing." (Moscow, April 1986. Coordinator: the Soviet Union. Participating countries: Hungary, the German Democratic Republic, Poland, and Czechoslovakia.)

The principal directions within this topic were R&D projects to increase the efficiency of using fixed satellite services, and to develop and optimize ground-terminal-station equipment for satellite services. Czechoslovakia elaborated the technical characteristics of a possible service switching system for the Intersputnik ground terminal stations. It also proposed a method of transmitting selected parameters to the control stations, and a set of data on the reliable operation of the individual subsystems of the Intersputnik system's ground terminal station in Czechoslovakia.

Topic 4. "Low-noise input device for the relay stations of satellite communications and broadcasting systems." (Sofia, May 1986. Coordinator: Bulgaria. Participating countries: Poland, the Soviet Union, and Czechoslovakia.)

Main attention focused on researching new equipment operating in bands over 10 GHz. Czechoslovakia's contributions were the development of a portable service generator and a signal for the calibration and repair of the radio relay stations receiving satellite transmissions in the 12-GHz band, and of a three-stage transistorized preamplifier.

Topic 5. "Elaboration of principles for the geostationary orbit's efficient utilization, and for the joint use of frequencies by satellite and terrestrial systems." (Zruc nad Sazavou, May 1986. Coordinator: Czechoslovakia. Participating countries: Bulgaria, Hungary, the German Democratic Republic, Poland, and the Soviet Union.)

Research and experimentation concentrated especially on analyzing electromagnetic compatibility, in a breakdown by the communications networks for the various types of services. In Czechoslovakia, the coordination module MANON was implemented on an EC [YeS] 1011 computer; the module solves the technical aspects of coordination between satellite communications and terrestrial radio relay links. Several variants of implementing satellite broadcasting systems in the 12-GHz band were analyzed from the viewpoint of interchannel interference.

The meeting summed up and evaluated the work done during the past year, and in the entire 1981-1985 period as well. The targets of main effort were the technical preparations for the WARC-ORB-85 conference, and the setting of specifications for implementing the European socialist countries' satellite television broadcasting system, from the viewpoint of compatibility with

other satellite television broadcasting systems and the communications systems for other services as well.

The meeting established that theoretical research and experimentation were essential to professionally brief on technical questions the telecommunications administrations belonging to the OSS [Organization for Cooperation of Socialist Countries in Telecommunications and Postal Services], before conferences at the level of the ITU. And that, with the available computer hardware and software, the group of experts was able to solve the technical problems which preparations for the second part of the WARC-ORB conference and evaluation of its conclusions raised. Moreover, that the problem of compatibility would require further study, in conjunction with the introduction of new technological components for the systems, new principles of transmission, and new, higher frequency bands.

Topic 6. "Development of a satellite broadcasting system in the 12-GHz band and its preparation for trial operation." (Warsaw, April 1986. Coordinator: Poland. Participating countries: Bulgaria, Hungary, the German Democratic Republic, the Soviet Union, and Czechoslovakia.)

Main effort was concentrated on preparing the draft of the socialist countries' satellite broadcasting system in the 12-GHz band, and on developing equipment for the system's implementation. Czechoslovakia built four receivers for large channel groups, and receivers for small groups, in the 12-GHz band. Their properties and parameters were tested experimentally, in a system that imitated the satellite system's conditions. Analyses were made of the socialist countries' coverage with the proposed beams of the system's satellite antennas at 12 GHz. And theoretical research was conducted into transmitting two accompanying audio signals over the satellite broadcasting system's transmission channel in the 12-GHz band.

At its [annual] meeting held in Poland (in Sopoty, in June 1986), the Intercosmos Program's Permanent Working Group for Space Communications discussed in detail the results of research and experimentation since its previous meeting. Delegations from Bulgaria, Hungary, Vietnam, the German Democratic Republic, Cuba, Poland, and the Soviet Union attended the meeting.

It was established that the scheduled research and experimentation had been carried out. The activities under the individual topics of cooperation were approved, including the minutes of the corresponding coordination meetings. A final report on the 1981-1985 activities and results of the Permanent Working Group for Space Communications was also drafted and approved.

Special attention was devoted to the coming period. In view of the Comprehensive Program of Research and Development that the CEMA countries had adopted for the period through the year 2000, the cooperation plan of the Permanent Working Group for Space Communications was amended so as to avoid duplications of effort. On the proposals of the coordinating countries, the individual topics' work schedules for 1986/78 [as published] were also revised. The main changes were made in Topic 6 (satellite broadcasting). The meeting deems it desirable that future annual meetings of the Permanent

Working Group for Space Communications receive progress reports on the development of a satellite broadcasting system in the 12-GHz band. The meeting approved the draft as a set of working papers for the system's development.

The Soviet delegation submitted a report on the operation of the "Dubna-0" test range in the Soviet Union. All countries participating in the Intercosmos Program helped to establish this test range. Its purpose is to provide an opportunity to participate in satellite communications research even for those countries that lack the necessary equipment. Comprehensive evaluation of the research results shows that this international test range fully serves its intended purpose, and that the research results are finding practical application especially in designing satellite communications systems and in developing new equipment for them. In this context the need was emphasized to speed up the work on satellite beacons in the 20- and 30-GHz bands, because it had been decided to investigate propagation in the 11-GHz band in the near future.

The Czechoslovak delegation submitted a report on the 1985-1986 activities and results under Topic 5. There were also a number of other items on the agenda. For example: debate on the draft of the European socialist countries' satellite broadcasting system in the 12-GHz band; on the results of cooperation with the Working Group for Space Physics and the Working Group for Earth Resources Technology; on the results of international space-communications conferences and consultations, etc.

The 1987 meeting of the Permanent Working Group for Space Communications will be held in Budapest. Lajos Horvath, the working group's incoming chairman, is a representative of Hungary's telecommunications administration.

1014
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EAST EUROPE/COMPUTERS

HUNGARIAN MICROCOMPUTER: PROCOM-6

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 1

[Text] The Computer Technology Informatics Development Subsidiary (SCI-L) has introduced its 16 bit general purpose, universal microcomputer Procom-6 which is compatible with the SZM 3 and SZM 4 computer family, which has an architecture identical with the DEC PDP-11 series. An essential feature is that it is suitable for building multiple work station systems (a maximum of 16 stations). It can be used advantageously in, among other things, enterprise business, production control, office automation and multiple work station program development. The chief users of the Procom-6 may be small to medium enterprises.

8984
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EAST EUROPE/COMPUTERS

HUNGARIAN EFFORTS TO CONTROL HETEROGENEOUS MARKET

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 1

[Text] The domestic market for professional personal computers is frequently characterized as unsurveyable, disordered, tangled, chaotic or by some other similar word. There are new trading and assembly undertakings every day, machines from Taiwan, England, Canada and Italy, an IBM PC/XT originally costing about 2,000 dollars is sold for 690,000 forints in one shop and for 1.2 million in another, AT compatible machines are sold for 182,000 and for six times that, pre-order lists of several thousand and noncompetitive domestic manufacture, foreign exchange being obtained through all sorts of channels... the situation is well known to the professionals.

At the end of July the responsible economic organs put on the agenda the domestic supply of PPC's and the problems of manufacture, trade, import and prices. The decision they reached took the stand that the domestic supply of PPC's must be solved with a coordination of import and domestic sources, with IBM compatible machines, with uniform conditions and a uniform system of requirements. The OMFB [National Technical Development Committee], the National Materials and Price Office and the Ministry of Industry have announced a competition to realize this decision. Associations with legal entity status are being formed on the basis of the competition of the contestants. The members of these can be foreign trade, capital goods trade, research and development, manufacturing and vendor enterprises and cooperatives interested in the import and production of professional parts, subassemblies and peripherals. The associations must see to the sale of PPC's under uniform commercial conditions, partly from import and partly from domestic manufacture, in an ever increasing ratio, in such a way that the domestic price level of the machines approximates the world market price level. In the interest of avoiding a monopoly situation the new "market alignment" is open and in justified cases there will be a way for new organizations to join in supply.

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EAST EUROPE/COMPUTERS

MOM RESPONDS TO CHARGES OF U.S. PERTEC PERIPHERALS

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 6

[The first of the following items appeared originally in COMPUTERWORLD, 31 Mar 86 (it is translated from the Hungarian reprint below); it is followed by the response of Laszlo Szegner, of the Hungarian Optical Works (MOM).]

Note by Dominic Imonti, vice president for marketing, Pertec Peripherals Corporation, Chatsworth, California

I recently returned from a trip to Hungary. I met there with the deputy minister of foreign trade and with responsible leaders of the Metrimpex foreign trade enterprise. This organization controls all foreign trade activity in Hungary connected with computer peripherals. My visit was at their request, that I might review the status of their technology. They are looking for opportunities to manufacture for the Western world.

The Hungarians want to discuss manufacturing licenses for older technology products regenerated by the West, producing hard foreign exchange by selling products to Westerners. They feel that cooperation with the West is a necessity today and that the potential market is gigantic compared to the size of the CEMA market. But they face large problems, problems which are virtually insurmountable.

In the first place their technology is at least 15 years behind ours. We visited a number of factories and producing plants, and they were showing the best they had. We saw a 2.5 megabyte head per track device, a 5 1/4 inch and an 8 inch floppy disk unit... but in every case only one example. We did not see actual current manufacture.

On the basis of what we saw the production of the 2.5 megabyte head per track unit can be regarded as a nice accomplishment. Talking of the 5 megabyte head per track drives it was clear that they have no possibilities in this area. Naturally our developments went far beyond the head per track concept 10 years ago and yet this is what they are proud of.

The production structure of the Hungarians is vertically integrated in an extraordinary way; they try to make as much as possible out of raw materials. But the movement among those participating in manufacture is very slow in the

vertically integrated chain, and depends on the availability of raw materials, the number of competing projects and the possible priorities of the given equipment, so even in the best case the delivery of the promised parts or products is unreliable. Their cheapest commodity is labor, taking into consideration all the withdrawals they pay about 60 cents per hour to an average employee. But not even the saving made on labor makes up for the deficiencies of the system and the technology.

Response by Laszlo Szegner, Hungarian Optical Works
We appreciated receiving your information about the article which appeared in COMPUTERWORLD and written by Mr Dominic Imonti. His article does contain a part pertaining to us.

Mr Imonti visited us last year. As a guest of the OMFB [National Technical Development Committee] he discussed cooperation possibilties in Hungary which might be important to us for both economic and innovation reasons.

Mr Imonti spent a scant hour and a half with us, at the Csorsz Street factory of the enterprise. We talked for two thirds of this time, leaving a fleeting half hour to visit the plant.

He said he was seeking cooperation possibilities. These might involve parts manufacture, subassembly manufacture or both. He asked about our products and asked about our ability to deliver.

I showed him our 5 1/4 inch and 8 inch floppy disk units and, during the visit to the plant, the 5 M byte fixed head store. I described the shop conditions.

So much for the original facts affecting us. But these facts are distorted when Mr Imonti presents himself in his article as an expert in technological cooperation with the East. This is understandable, because, according to his best convictions the author wants to prove the impossibility of cooperation.

What was distorted?
He states that he saw only one example of the floppy, and not manufacture. This is true. We make them in series of 30,000 in Dunaujvaros, as we told him.

He states that we "brag" about the 5 M byte fixed head store. What really happened was that we showed him our technological possibilities as a possible partner.

Unfortunately this sort of bad faith and discredit pervade the entire article. What he experienced with us was, in my opinion, simply an isolated example serving to close a system of political prejudice.

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EAST EUROPE/COMPUTERS

VIEWS OF NEW CHIEF OF HUNGARIAN COMPUTER RESEARCH INSTITUTE

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 7

[Interview with Academician Laszlo Kevicky, director of the MTA SZTAKI (Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences), by Tamas Kolossa]

[Text] The painters are already on the third floor at the MTA SZTAKI. In their wake one can see pure order everywhere and smell the newly painted walls. Outsiders ask one another: Who is really repainting the SZTAKI? The new director, or his predecessor, Academician Tibor Vamos? Why did the internationally famous scientist put in his place a new director who thus far is known only in professional circles, and if he did why did he retain the office of president of the Institute Council? Since 1 January 1986 Academician Laszlo Keviczky (41 years old) has been director of the SZTAKI.

[Question] Does it bother you that everyone compares you to and measures you by Tibor Vamos, the well known personality?

[Answer] No. My colleagues know that although Tibor Vamos is my model in many respects I do not want to be simply a copy of him. I cannot yet match his science policy activity, human features or wisdom. For the time being I cannot turn as much attention to my subordinates and the outside world as he has and does, but with time I would like to do this too, from the heart and without forcing it.

[Question] So how do you evaluate Tibor Vamos? Is he a saint who takes seriously the voice of the times and makes way for young people, or is he a tired savant who is freed of responsibility?

[Answer] For the most part the judgment of him is extreme. It is not important whether he is a saint or not; one must understand the essence hiding in the process. Often he acts oddly at first sight, but one must note that it is not by chance that he goes about in a pullover in his own Zhiguli. In this institute almost every leader is about 40 years old. Tibor Vamos indicated in 1984 that he was giving up his place. Many did not believe him. Then--as I learned later--he began to look around, discussed, weighed, and selected me from among several nominees. And I did not work directly with him. According to many he is not precise in details. Well, he built carefully later and

informed everyone about the change, here and abroad. Probably it was due to the deliberateness that the change was not accompaned by really sharp position struggles. Why did he do all this at 60 years, at the peak of his career? Today, in general, older people lead the university, scientific and other institutions and it is hard for them to pass on the baton. It is extraordinarily difficult to socialize this; the decree and committee system do not help. For this reason the second line of the leadership is demoralized. So I consider what happened here to be exemplary.

[Question] What is the role of the Institute Council? In plain language, how is the power divided up?

[Answer] The Institute Council has no say in operational guidance. I get fatherly advice, which I certainly need. Because I did not go through that school and do not have a broad system of contacts. Tibor Vamos is president in the council; the members are Academician Arpad Csurgay, deputy first secretary of the MTA [Hungarian Academy of Sciences], Academician Sandor Csibi, Academician Vera T.-Soos, Jozsef Hatvany, who is also a member of the engineering academy of the United States, and Pal Bansagi, secretary of the council and a main department chief in the OMFB [National Technical Development Committee]. We will need their opinions to develop institute strategy.

[Question] What distinguishes you from your predecessor, how do you want to lead the institute?

[Answer] I will be aided by the director's conference and council, where we try to organize a free flow of information and balance with democratic decisions the pluralism deriving from a deliberate lack of rules. We must seek new methods to communicate with one another, for all of us are around 40 years of age, one a State Prize winner, another an academician, and so forth. One cannot deny that this mechanism is not operating smoothly yet. The half year past was rosy, the troubles will come later. I would like to lead in such a way that I am the first man but without putting my person in the foreground in everything. I like the role of the wise man to whom it is always worth talking. I know that you cannot shake the leadership with your little finger, because this could cause serious injuries. Despite this I feel that in demanding results we must be substantially harder than our predecessors. This is why I did not seek new colleagues after my appointment, but after a year the deputy directors--and maybe the chiefs of the main departments--will have to submit a proposal concerning their future ideas. So we will get to know one another in the work, and everyone will have to reckon with the competition.

[Question] Have you studied how the effectiveness of the institute has developed in the half year past?

[Answer] Yes, and although we are happy that this is the first year in a long time that we have no serious circulating fund problems I must admit that in the good old Hungarian way this result was achieved with many little cutbacks. The research themes did not receive less but we made assets acquisition more closely interdependent with the successfulness of the projects.

[Question] Are there new sources of money for the institute?

[Answer] I look upon the OTKA [National Scientific Research Fund] and programs G1 and G6 of the OKKFT [National Medium-Range Research and Development Plan] as the government providing more for research, in a more democratic form and with fewer controls than before. These funds are of vital importance for small institutions; for us they have a supplementary role, primarily because they can be used to finance new areas. Other central sources continue to be restricted, which makes the institute vulnerable. In market activity the license fees and microcomputer applications receipts are considerable.

[Question] There are sharp debates about the distribution of the sums which one can compete for. What is your position?

[Answer] The OTKA indicates the divided nature of domestic scientific life, for, behold, we have more faith in a judgment mechanism than in professional knowledge. At the same time it is difficult to harmonize interests in any other way. So I am not completely convinced that it is good, but neither do I want to join the camp of its enemies. In part this solution is internationally recognized; on the other hand if we are talking about the first step of a process then I evaluate it positively. Let me say only this about the G1 and the G6: The year is slowly slipping away and some of the contracts are still not signed. I believe that this reflects a selection a good bit more strict than before. I do not consider the positions of the SZTAKI to be bad.

[Question] Will the SZTAKI strategy change?

[Answer] In my competition conception I wrote that the institute must be an outstanding intellectual center which is unambiguously set off from the developmental institutes of an entrepreneurial character connected to the competitive sphere; on the other hand, research and development tasks of national economic significance must be the definitive ones in our industrial and applications projects.

[Question] Does this mean that the SZTAKI which has had an entrepreneurial spirit is retreating?

[Answer] No. Only the undertakings should not be going on within the frameworks of the institute. Out of self-defense I am drawing a line between intellectual achievements which can be measured by international standards and industrial undertakings of economic significance. It is a schizophrenic situation that when the very valuable brain power which has accumulated here moves toward applications in accordance with central expectations then they right away charge us with unfair competition, and from time to time want to force us within the frameworks of enterprise regulation. It must be made clear that our first task is to produce intellectual achievements of national economic significance, outstanding even at the international level. Otherwise we would not be an Academy institute. It is important that the SZTAKI stands on multicultural foundations, that its international competitiveness lies in the completeness of the computer technology vertical structure. This is why we can think in terms of systems, and this unambiguously is the path of the future.

[Question] From which one can derive the technical development conception....

[Answer] Precisely. And it is summed up in three fundamental points. One: We must greatly increase the performance of local intelligence systems, so we are dealing with higher level computer architectures and multiprocessor systems. Two: Following from this the traditional man-machine link is no longer satisfactory, we must develop the most modern solutions. Three: These high performance local intelligence systems must be organized into high speed local nets in every area and at a higher conceptual level.

[Question] Can you give concrete examples?

[Answer] These include, for example: the Laocon (distributed intelligence industrial control system); the Probeway (a development system for process control organized into a network); the COBUS and the LANPBOX (high speed local networks for office automation and design systems); and the computer network of the Academy. Of national economic significance are, for example: the control software for the telemechanical system for the national gas network; the training system for air traffic control; or the cassette reloading system being prepared at Paks. We are treating the already mentioned Probeway and the MAP (Manufacturing Automation Protocol) as standards to be followed. Finally, we have received a request to build or act as patron for the basic system for the information infrastructure for national research and development.

[Question] How about basic research?

[Answer] There is slow movement in the direction of artificial intelligence research. Expert systems aimed at certain applications areas are being developed and more and more people are dealing with the theoretical problems behind this theme. It has turned out that sometimes theory is too abstract, practice is posing new questions. For my part I would still call something an expert system only if the interaction realized between machine intelligence and human intelligence significantly increased the capacity of the latter. One of our groups, under the leadership of Jozsef Hatvany, is developing an expert system for machine industry assembly automation and design. Tibor Vamos leads the development of a system to aid in the diagnosis of newborn babies. And I am among the developers of a consulting system supporting milling technologies.

[Question] In your judgment which areas of computer technology are most backward?

[Answer] The matter of technology in the general sense is not solved or cleared up, whether we are talking about hardware or software. Our intellectual capacity can be however great if we do not have the technology to go with it. We cannot carry out great projects with stone axe methods. So we have to get the technologies, and build the intellectual staff on that. It is not by chance that in the competitions there is great pressure to get machines, tools, technologies. In our country if somebody gets technology from

the central funds he guards it jealously, is not happy to show it or give it to outsiders. Here also the SZTAKI will follow a different policy.

Biographic Sketch

Perhaps it is due to his age that his style is not "academic." He uses the familiar form of address and laughs out loud, his office is freshly painted and simply furnished, an Apple Macintosh stands on his desk.

He was born in Rackeve on 2 April 1945. He graduated from the instrument and control technology section of the Budapest Technical University in 1968. He was then chosen by Professor Csaky, chief of the automation factulty, from among many applicants. Although Tibor Vamos invited him many times he went over to the SZTAKI only in 1981. He became chief of the process control main department which was formed at that time. Since 1981 he has been a member of the leadership of the International Automation Federation. In the spring of 1985 he became a corresponding member of the Hungarian Academy of Sciences. He is the second youngest academician, after mathematician Laszlo Lovasz. The title of his inaugural address was "Adaptivity in Control Technology." This year, for 12 weeks, he visited the most important computer technology institutions in the United States.

His wife, Csilla Banyasz, is also a noted electrical engineer and works at the SZTAKI. They began their common life in a sublet room where two sons and five dissertations were born. They got an independent home in 1980 with the support of the Academy. Today they live on Kende Street, almost opposite their place of work.

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EAST EUROPE/COMPUTERS

HIGH SPEED DATA TRANSMISSION EQUIPMENT FOR COMPUTER NETWORKS

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 10

[Article by Peter Bogardi and Geza Paksy: "High Speed Baseband Data Transmission Equipment." The first paragraph is an editorial introduction.]

[Text] With the equipment described here Peter Bogardi, Janos Milcsak and Geza Paksy won the second prize in the national competition announced by the MTESZ [Federation of Technical and Scientific Associations] titled "Development of Domestic Telecommunications." Given the present condition of domestic telecommunications the device could be an important link in the development of computer networks. This is indicated by the interest thus far of managers, manufacturers and users.

The need for fast and reliable transmission of digital information is appearing in our country also to an ever greater extent. Studying the present status of data transmission applications from the viewpoint of transmission we can establish the following: In the great majority of cases the method of connection is of the terminal-computer type; the volume of data transmitted is relatively small (10-10,000 characters per hour); the data transmission speed used is 300-2,400 bits per second; in more than 90 percent of the cases the distance between linked equipment falls between 0.1 and 20 kilometers; the data transmission medium, in practically 100 percent of the cases, is postal or similar quality symmetrical cable.

The number of computers put into operation in our country in the past two decades is several tens of thousands. The hardware/software capacity of the devices makes possible applications--from computer supported engineering design to supplying institutions at the most different levels with up-to-date information--which make necessary a dynamic distribution of the resources of the computers, accessing various data files from various places.

These applications are accompanied by changes of orders of magnitude in some of the above data transmission characteristics. The causes of this are:

--the volume of data intended for transmission often reaches or exceeds an M byte;

--computer-computer links are needed instead of terminal-computer links.

Consequently the time for transmission of a block of data can increase to several hours; for example, transmission of one M byte at a speed of 1,200 bits per second takes about 2.3 hours.

These times are not acceptable in practice, so a condition for realization of the applications--naturally not a sufficient condition but a necessary one--is an order of magnitude increase in data transmission speed.

The local networks which have spread in recent years provide speeds of 1-100 M bits per second over small distances (within 1-2 kilometers). But this is done through a very expensive transmission medium, coaxial, optical, etc. cables, where, in addition to the cost, the work connected with building the link can cause serious problems.

These problems appeared earlier in countries more developed than we and they tried to satisfy the needs appearing with ever fuller exploitation of the existing possibilities.

An unexploited possibility is in the band width of symmetrical cable. Traditional modems transform the digital signals into an analog signal the spectrum of which does not exceed the 0.3-3.4 kHz band width of a telephone channel. But in the case of a direct, galvanic link with a length not greater than 10-20 kilometers the useable band width of postal symmetrical cable is several hundred kHz. Since traditional modems use only about one percent of this the achievable data transmission speed is limited to 2.4-4.8 K bits per second. There are modems working in telephone channels using a very complex modulation procedure and realized with advanced circuit technology which reach a speed of about 10 K bits per second. But the price of these is extraordinarily high and acquisition of them is hardly possible for us because of the restrictions.

So a solution is given by a modulation or coding procedure which makes possible, in an economical way, fast and reliable data transmission using the band width of the existing installed or easily expandable postal cable network. Such so-called baseband data transmission equipment appeared about a decade ago in the offerings of leading western manufacturers. Out of a very broad assortment we mention as examples the Racal Milgo (England) COMLINK IV or the TRT (France) Sematrans 1001 equipment.

On the basis of this it is worth comparing the limits on the utility of baseband modems with their other characteristics and drawing conclusions from the result applicable to use areas and the possibility of extending them.

Compared to traditional modems, ones working in telephone channels, there are two restrictions connected with use of baseband modems: They need a direct, galvanic link (because of the great band width) and the distance which can be bridged is 5-20 kilometers.

These constraints limit the utility of baseband modems to their use within one site. In reality however this is not a strong restriction--taking into consideration the fact mentioned in the introduction according to which the

great majority of links are established at a distance within 20 kilometers--and it hardly limits applications numerically.

In regard to other characteristics the baseband modems are more advantageous than traditional modems in virtually every respect:

--the data transmission speed which can be attained is 0.3-280 K bits per second (this is a function of cable diameter and distance, 1 M bit per second can be attained within one kilometer);

--their construction is simpler, they consist of fewer parts, so they are cheaper and more reliable, their power consumption and sensitivity to interference are smaller and their error rate is better by at least two orders of magnitude.

So in regard to use possibilities the baseband modems offer a favorable solution to realization of high data transmission speeds. But of no less significance is the fact that--supplemented with a multiplexor--one can realize several smaller speed data transmission links on one cable. In the developed countries they consider this an economic advantage--they have to pay less in line lease fees for a given number of links. For us this could be a vital question from the viewpoint of realizing data links; with multiple use of one existing data transmission connection we could create links which might not be realized at all on independent lines, in the absence of such lines.

The Equipment Developed

The first generation of baseband modems was the type called GDN by Siemens; the principle of this was used later by a number of firms in their equipment. These are very sensitive to the compensation of the cable; in practice one cannot attain with them speeds above 9,600 bits per second.

One can achieve reliable transmission above 9,600 bits per second at distances of 10-20 kilometers with digital coding. The great advantage of the principle is synchronous transmission, which offers a substantially more advantageous regeneration possibility. So we used such a coding procedure in our device.

Similar equipment already operates on the Hungarian postal network, but only in small numbers and, because of the embargo, up to speeds of only 19.2 K bits per second. When developing the equipment the goal was a device working on the above principle and made of circuits which could be obtained here at home, which not only could replace import but also might offer on a broad scale a technical possibility for using greater speeds and thus utilization of the inventory of computer technology equipment qualitatively better than at present.

The experimental equipment was made for a speed of 48 K bits per second with a V24/RS232 interface on the user side. An automatic corrector performs length compensation of the cable.

Technical Characteristics

Transmission Characteristics

Compensation: automatic, coverage 20 dB.

The maximum effective distance which can be obtained is determined by the attenuation and crosstalk and noise relationships of the cable measured at 48 kHz.

Typical values:

Cable Diameter	Effective Distance
0.5 mm	6-8 km
0.6 mm	9-11 km
0.7 mm	10-13 km
0.8 mm	15-17 km
0.9 mm	18-20 km

Data Transmission Characteristics

Data speed: 48 K bits per second (variable between 1.2 and 280 K bits per second).

Transmission mode: full duplex.

Transmission medium: symmetrical, unloaded, 0.4-1.2 mm diameter, paper or polyethylene insulated telecommunications cable.

Data format: serial, synchronous.

Error rate: less than 10^{-6}.

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TAP-34 M TERMINAL OF HUNGARIAN TELEPHONE FACTORY

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[Text] The TAP-34 M intelligent terminal of the Telephone Factory works with the VDOS operating system compatible with CP/M but it is also capable of running the earlier TAP-34 operating system and programs supported by it. The device, based on an 8 bit microprocessor, has 64 K bytes of RAM and is equipped with four single sided, double density 8 inch floppy disk units each with a capacity of 0.6 M bytes. As a result of series manufacture which began at the beginning of the year they had made about 200 TAP-34 M units as of mid July. They are suitable for handling Cyrillic character messages and all of them have been exported to two socialist countries. The new TAP communications protocol is the V 2780, which is compatible with the IBM 2780. It is also noteworthy that they have developed a TAP-34 EDT conversational terminal emulator compatible with the IBM 3275 for the intelligent terminal.

A hall showing the computer and transmission technology products of the factory will open this fall in the administration building of the Telephone Factory. Here one will be able to see the products sold at home and abroad and prototypes of the newest current developments.

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HUNGARIAN REGULATIONS AFFECTING SOFTWARE AUTHOR RIGHTS, FEES

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[Article by Gyorgy Palos: "Author's Rights and Fees"]

[Text] According to valid regulations the author of software is entitled to a fee. Questions of fee payment and use must be settled in a contract.

Software is one of those types of work for which the parties freely agree on the magnitude of the fee due to the author.

What has been said applies to the case where the author creates the software outside of the obligations of his job. The valid copyright regulations--Law No III 1969 (Szjt [abbreviation for "copyright law"]) and Ministry of Culture decree No 6/1969 (XII 29) MM (Vhr [abbreviation for this decree])--define those cases in which the author of a work created within the framework of a job is entitled to fee payment above his wages. If, in spite of his regulatory obligation, the employer is not inclined to pay the author's fee then the author can assert his rights in the courts.

According to the Vhr the payment of an author's fee--above wages--is due to the author if the employer signs a use contract for the work with a third person. The employer is entitled to sign such a contract if the employee created the work within the framework of his job obligation, and the right of the employer to use of the work follows from the content of the work relationship.

There can be two types of contract with a third person:
a. Signing the contract with a third party does not fall in the sphere of tasks of the employer (for example, having employees write an article for a daily paper's own purposes, it is not in his sphere of tasks to have articles written for other papers or other organs);

b. Signing a contract with a third party does fall in the sphere of tasks of the employer (for example, a planning enterprise or a software house).

In both cases the regulations establish limit values which differ from one another. If signing a contract with a third person does not fall in the sphere of tasks of the employer then the author gets 60-80 percent of the sum which

the employer gets from the third person. The 60 and 80 percent are the lower and upper limits established by the regulations; a fee below or above this cannot be paid. If the employer pays less than 60 percent the author can turn to the courts. The author cannot turn to the courts if, for example, the employer establishes 70 percent and the author considers this too little because he was asking for 75 percent.

If signing a contract with a third person does fall in the sphere of tasks of the employer then the employer can establish a fee lower than 60 percent. Naturally payment less than 60 percent cannot be interpreted to mean that the employer pays nothing. If the employer does not pay then the author can turn to the courts and in this case the court will not only establish that the author is entitled to payment but also will set the size of the payment.

The above applies to every type of work with the exception of software; thus it applies to studies or works which appear in areas related to computer technology but which cannot be regarded as software. The regulation pertaining to software provides differently.

Ministry of Culture decree No 15/1983 (VII 12) MM defines the percentage of the fee due to the software author. In the case of software one can establish 10-30 percent, instead of 60-80 percent, and in the case where the employer can go below 60 percent for other types of work this means 10 percent for software, so he can go below 10 percent.

It is important to point out that the base for the author's fee is constituted by the sum which the employer gets for the software. There can be no withdrawals from this. The decree also states that "if signing a use contract with a third person for the work falls in the sphere of tasks of the employer then the employer can determine the fee for the author of the work at a level less than 60 percent, 10 percent in the case of software, of the royalty--taking into consideration the expenditures connected with creation of the work."

It is unambiguous from this that the expenditures connected with creation of the work can be taken into consideration only in regard to the magnitude of the royalty and not in regard to the compensation constituting the base for the royalty, compensation which the employer receives because he signed the license contract for the software and thus received the use fee, lease fee or any other countervalue.

Fee payment is due the author also in the case where the enterprise did not get money for the software but rather received countervalue, for example other software.

It must be pointed out that the rate below 10 percent established by the regulations is not an obligation. The regulations state that a rate below 10 percent "can" be established, and this interpretation is confirmed by judgment Pf IV 20.417/1982/19 of the Supreme Court in which the court established a fee of 15 percent despite the fact that in this case the signing of a contract with a third person fell in the activity sphere of the enterprise and on the basis of this condition the rate could have gone under 10 percent. It is also

unambiguous from the judgment that the Supreme Court regarded as the base for the author's fee the entire sum which the employing enterprise received for the software. Attention must also be called to the fact that according to the above cited decree an author's fee due to an entity not a legal entity must be paid to the author through the Authors' Legal Protection Office. An exception to this provision is where the employer is paying the fee to the author of software prepared within the framework of a job obligation, the employer can pay directly. However if the party involved is not an employee, so what is involved is not software created within the framework of a job obligation, then the fee due the author can be paid only in the above manner.

The rights and obligations connected with the use of software are regulated in a contract by the author and the user. The guides for the contract are the copyright law and the provisions of the Ptk [Civil Code].

A software use contract is actually a license contract in which the parties precisely define what use rights are being authorized in connection with the software and what the limitations on the rights are (method of use, temporal and regional restrictions, etc.).

The conveyance of a copyright is not possible in copyright law. Paragraph 1, Section 12 of the copyright law unambiguously states that the rights attaching to the person are unlimited in time, the author cannot convey his rights to another and cannot surrender them. So, as a consequence of this provision, it is only possible for the author to convey his property rights, that is to give authorization, in regard to property law, for various use methods or for all use methods. After the expiration of the protected time use is free and in this case the assent of the author is not needed and a fee does not have to be paid for use of the work.

The law does not demand the signing of a contract in the case of the fees due the creator of software created within the framework of a job obligation. But practice shows that it is certainly useful if organs preparing, selling or managing software supplement their rules for inventors and innovators with a part pertaining to software authors. This gives the software authors certain security and one can regulate the enterprise system in regard to paying authors of software and in regard to procedures connected with this.

Signing a contract is not a consequence of a regulatory obligation but it is certainly useful if the enterprise agrees with the author in advance that if the software is sold to a third person then what percentage of the compensation received for the software will the author be paid as an author's royalty.

If the user pays the royalty through the Authors' Legal Protection Office then the Authors' Legal Protection Office withdraws the tax, so the user should not withdraw the tax.

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DEVELOPMENT OF USER SYSTEMS AT HUNGARIAN CONSTRUCTION INSTITUTE

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[Article by Laszlo Bagonyi and Gyorgy Zombori: "Development of User Systems at the EGSZI," the first article in an 8 page insert devoted to the EGSZI, Construction Management and Organization Institute.]

[Text] Adapting to changing economic conditions the Construction Management and Organization Institute has developed a new organizational system. Within the framework of this it has established subsidiary enterprises in the regional centers (Miskolc, Debrecen, Szeged, Pecs and Gyor) and in the capital.

Naturally the modernized organizational system has had an effect on the division of labor in regard to computer technology developments taking place at the institute. Accordingly it is the task of the developmental organizations of the parent institute to service and maintain existing systems and develop new user systems. These new developments realize in part centrally determined and financed themes and in part they realize program systems serving to satisfy the needs of the software market or end users.

The chief task of the subsidiary enterprises is to offer services to the enterprises, using the institutional software, provide feedback to the developmental organizations on reception of the programs and solve program adaptations and minor tasks.

The Organization Development Council aiding the exercise of the decision rights of the institute leaders within the framework of a forum system has a role in determining the developmental goals in that its task is to offer opinions at the institute level on computer technology development ideas, taking into consideration the customer needs and market possibilities, to submit proposals and to make decisions in matters referred to its sphere of authority.

Carrying out the tasks contained in the several developmental guidelines--on the basis of a corporate decision--is primarily the task of the central developmental apparatus.

Development commissions can be partly in the form of direct commissions and partly in the form of a competition.

Financing is realized by use of institute resources either as a one-time commission or within the framework of a repayable (loan) action.

Well functioning user clubs are active within the framework of the organizational system. It is the task of these to cooperate in the preparation of computer technology developments taking place in the institute, to collect user experiences with the developed systems and feed these back into the developmental process.

The activity of the institute's user clubs extends to such areas as material management, manpower and wage management, production organization and control, undertakings and budgeting.

As a result of the system development activity thus far the institute has a significant inventory of software made up of programs which can be run on large, small and microcomputers.

The earlier large computer program packages were suitable primarily for batched processing. The newer developments, the so-called second generation systems, are based on the idea of a distributed system. Thus the operational processing is done on microcomputers--in this case microcomputers located out in the enterprises and leased by the institute. The tasks running on the large computer are integrated into a common database so that the enterprise uses some or all of the modules from a part system.

The systems have been prepared to use a remote data processing device system also.

The mini and microcomputer programs of the institute can run on A 6402, SZM 4, TPA, TAP-34, M08X, IBM PC/XT and compatible machines.

The systems developed at the institute are primarily user applications programs. These are the following:

--programs supporting production preparation and control and aiding undertakings (economic calculations, task scheduling and recording, contract recording, budgeting and accounting);

--programs aiding fixed assets management (fixed assets management, inventorying fixed assets and accessories, keeping records on machine parts);

--materials and energy management programs (materials management, stockpile analysis, keeping records on orders);

--transportation management programs (transportion management, way-bill processing, freight cost accounting);

--labor affairs programs (manpower and wage management, wage accounting, wage statistics);

--programs for accounting and financial systems (general ledger and current accounts, costing);

--programs supporting the work of the councils (education, demographic, health affairs, planning and housing systems); and

--technical design programs (statics, building mechanics, network planning, geodesic and engineering calculations).

The large computer systems can generally be run on ESZR I and II (IBM 360, 370) series machines. The operational and interactive systems can be used independently on mini and microcomputers or by using distributed operation. The technical design programs can be run on the Siemens computer or on the mini and microcomputers.

In addition the institute works on the solution of technological problems of large scale software manufacture. In the course of this it has developed a uniform documentation system and two protected products:

--the ERPEL (uniform system and program development procedures) system contains ready-made system design and program elements which can be built into various user programs without change;

--the MPG 60 (modular interactive program system) is a software tool developed on the basis of uniform design principles primarily to develop and operate a family of data processing program packages. It guarantees the fast, reliable and convenient development and operation of interactive program packages for the indicated area.

Going beyond the above we have prepared framework systems which simplify screen management on various types of minicomputers (A 6402, SZM 4) and microcomputers (TAP-34, M08X, IBM PC/XT) and provide a link with the file manager and program language.

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NAVIGATIONAL FLIGHT PLAN SYSTEM AT MALEV DESCRIBED

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[Interview with Sandor Gereczi, of the computer technology department of MALEV, the Hungarian Air Transport Enterprise, by Gabor Markus: "New Navigational Flight Planning System at MALEV"]

[Text] Due to the increasing capacity and cheaper price of computers computer technology is now playing an ever more important role in flying also. Huge computer centers have been established where high performance machines serve the needs of flight by processing large volumes of data via a telecommunications network covering the entire world.

Microcomputer use is spreading at the same time as a result of the great increase in the capacity of these machines. A few months ago at MALEV also they developed a navigational flight planning system called NAVIG which can run on a personal computer. I asked electrical engineer Sandor Gereczi, of the computer technology department, who developed the system, about the operation of the system and about the first experiences.

[Answer] With the appearance of small but relatively powerful and reliable computers it became possible to install microcomputers on board. These machines check the parameters of the flight, aid navigation and contribute greatly to the correct decisions of the crews. We are on the threshold of using artificial satellites and a spread of computer-computer links between on-board and ground computers.

Connected to a databank the local networks make possible fast access to large volumes of information. Computers may have a role in the general management tasks connected with flying, in planning crews, in scheduling maintenance or--as in our case--in navigational preparation for the flight.

[Question] What sort of computer does the program run on and what is the chief task of the system?

[Answer] The NAVIG flight planning system is a computer system using the 8 bit M08X personal computer manufactured by the SZKI [Hungarian Computer Research and Development Center]. It is intended to aid or replace the planning

procedure used thus far with a more modern, more precise and faster planning procedure. The system has three chief goals:

--pre-planning for commercial purposes, which is not connected with concrete routes or flights and which aids primarily the cost accounting necessary for making a commercial price bid (fuel consumption, time, etc.);

--pre-planning of a concrete flight, preparing a navigational flight plan (traditionally called the "navigation log"), taking into consideration the factors influencing the flight (take-off weight, meteorological conditions, etc.);

--reducing flight costs by making possible the preparation of a flight plan which reduces fuel consumption and--possibly--flight time with a better selection of the parameters needed for planning (for example, the amount of extra fuel needed, flying altitude).

One can display the results of flight plan alternatives for purposes of comparison so the planner has the opportunity to consider factors not included in the computer data processing in order to select the optimal solution.

[Question] Obviously a flight can take different routes at different altitudes. The costs of the flight are different as a function of all these parameters. How are these parameters built into the system?

[Answer] In general a given flight goal can be reached by several routes. The shortest of these promises the most economical solution, but many other factors--geographic, political, etc.--can influence route selection.

In part the flight altitude is a function of the length of the route, because on a short run one cannot attain the altitude giving smaller specific consumption. For flights of a given distance there is always a smallest consumption altitude with a given take-off weight and known meteorological conditions. Flying lower than this the drag is greater than necessary for the plane is in thicker air for a long time. When flying higher than the optimal altitude the long ascent increases consumption. The system helps to select the altitude guaranteeing smallest consumption under the given concrete conditions.

The smaller specific consumption altitude can be attained in a longer flight and with the aid of the system one can check what savings are represented by the higher altitude permitted in accordance with the direction of the flight. This is especially applicable for a longer route where the energy needed to ascend decreases due to the weight reduction accompanying consumption of fuel. The system takes into consideration the extra fuel and extra time needed for ascent or the reduction in fuel and time (if descent becomes necessary during horizontal flight for some emergency or plannable reason).

[Question] Meteorological conditions can also influence the costs of a flight.

[Answer] That is true, indeed changing the flight altitude can be justified with knowledge of the meteorological conditions. This planning system regards

the wind and temperature values at altitudes of 3,000, 5,500, 7,100, 9,100 and 10,300 meters as knowns. In the calculations the system notes temperature in the form of deviations from normal atmosphere when ascending and in horizontal flight. In addition, for horizontal flight, we put the wind component in the direction of flight (with positive or negative sign) into the system. If the data are available in a finer altitude breakdown then we can calculate more precisely the effect of meteorological conditions at greater flight altitudes.

[Question] How does the system calculate the volume of fuel to be loaded?

[Answer] The fuel consumption increased by the navigation reserve supplemented by the fuel used during taxiing and the alternative fuel needed to reach possible detour airfields gives the minimum amount of fuel to be loaded. Since this can have a considerable effect on costs the airfield requiring less fuel--in addition to other conditions--must be given the advantage when selecting the detour airfield.

Otherwise taking on more fuel than minimally necessary is a question depending on the business policy of the enterprise. In a few cases it is worth carrying extra fuel so that less has to be taken on at a foreign airfield. Of course this has a price because the increased take-off weight means increased consumption. Among other things the computer system developed by us helps to clarify what the extra fuel load costs and how it will pay for itself, where the limit is to most favorable fueling.

[Question] What is the structure of the planning system?

[Answer] The system consists of two logically distinct parts. These are creation and maintenance of the database on the one hand and the actual planning on the other. Both can be handled in the conversational mode--because of the character of the computer. The data typed in on the keyboard appear on the screen, as do the answers of the machine and the computed results. All the functions performed by the system can be performed with one program, so new programs do not have to be loaded. (This is done automatically by the program or the operating system with the so-called overlay technique.)

[Question] As I understand it the flight task means flying from report point to report point in the area covered by the planes of MALEV. This takes place in a predetermined way, so there is no possibility for free route selection, as there is for flights over oceans supported by inertial navigation systems.

[Answer] That is true, and just this fact makes possible pre-planning of the flight with a flight plan which can be adhered to with great probability. The basic idea of the planning system was creation of a database in which the control points (and their characteristics, such as the DME frequency) and the sections linking the points (and their characteristics, such as distance and direction) figure only once. An optional route can be built up from these elements. So the route is a series of navigational check points the initial and end points of which are airfields the data for which we store separately, but only once.

[Question] How are meteorological data stored in the system?

[Answer] We regard the meteorological characteristics, divided up according to altitude, as constant for a section flown, thus the meteorological data are section characteristics. It is not necessary, however, for the meteorological characteristics to be different for every section. They can be regarded as homogeneous in a properly selected area. At present the loading and updating of meteorological data are done by typing in the data. But we plan to get and store the data from the Meteorological Institute via a direct computer link.

[Question] What other data does the database of the system include?

[Answer] The technical data on the planes are also placed in the database. A real problem in this connection was caused by putting in and storing the diagrams, graphs, tables and limit values corresponding to the various methods in the air operations instructions. In addition, the work areas are also organic parts of the database. Into these we put variations of the flight plans and they remain there until others overwrite them. The number and size of the work areas can be chosen as a function of the disk space available. At present there is room for five 155 line flight plans.

[Question] Can one expect an economic profit, for example fuel savings, from introduction of the system?

[Answer] Yes, that is the chief goal of introducing the system. But it is difficult to estimate in advance the numerical sum expressed in forints. Fuel consumption in flying depends on numerous factors--as in, for example, driving automobiles--and at present MALEV, with its low specific consumption values, leads among the socialist airlines using the same types of planes. Nevertheless, conservative management of fuel is an important task for in the course of 13,000 take-offs per year the planes of MALEV use nearly one billion forints worth of fuel.

We did a test planning with the system in order to determine on the Budapest-London route, which counts as a medium one, how fuel consumption and flight time depend on take-off weight, altitude and meteorological conditions. According to this a flight at 10,500 meters results in 360 kilograms extra consumption and 3 minutes extra flight time in the course of a single flight compared to a flight at 11,700 meters. It also turned out that one could save 80 kilograms at this distance with every one ton reduction in take-off weight. Taking into consideration the fuel prices at the moment one can easily calculate the degree to which it is worth taking on more than minimally necessary here at home or at "cheap" airfields.

We could also demonstrate the direct effect of wind from the planning example. For example, according to this a northwest wind at 150 kilometers per hour--which has an average component of 130 kilometers per hour opposite the direction of flight--causes 1,010 kilograms extra consumption and 13 minutes extra flying time compared to no wind. So it would be worth choosing--if possible--an altitude and a route where the wind component was smaller. The program provides a possibility for this.

Summing everything up it seems probable that we could get a 2-3 percent fuel saving as a result of introducing the system, but the concrete numerical values will become apparent only on the basis of continual, longer term measurements.

[Question] When will the system be introduced?

[Answer] Test operation has begun already. Indeed, the personnel in the navigation department have been trained already. The commanders are getting computerized plans tailored for the concrete flight as a test together with the old, fixed flight plans. But the time for final introduction is not yet known; in flying this always depends on a strict authorization procedure. But whenever the system is introduced it appears now that the M08X will not be able to handle it. For this reason we are already preparing a version of the system to run on the larger capacity Proper-16.

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HUNGARIANS DEVELOP ADAPTABLE PHOTOCOMPOSING SYSTEM

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[Article by T. K.: "Photocomposing System of ITEX"]

[Text] First among the enterprises of the socialist countries the Hungarian ITEX Research-Development-Producing Association has developed a photocomposing system capable of satisfying a broad variety of needs of various presses depending on how it is put together.

Taking domestic conditions as a base the system is compatible with the Proper-16 or IBM PC and is based on computers which can be connected into a network. Sale of it will begin in the second half of 1987.

The input of the photocomposing system is so-called "infinite" text or infinite text which has already been supplied with the typographical instructions needed for later operations. During automatic composing the text appears first composed into columns, then automatic make-up breaks these columns into parts and puts them side by side forming--after suitable correction cycles--the type area to be projected. Then the projector produces the film from which the print form is made.

The hardware and software of the ITEX photocomposing system have a modular structure. A suitable assembly of the elements of the system can ensure the optimal solution of the given task.

In the simplest case a composing-makeup computer supplied with an alphanumeric monitor produces the data for the projector from the text entered. In this case we can do graphic checks and proofing only after projection; the projector will be burdened to only a very small degree by the operational speed conditions.

In the most developed system 4-8 work stations are connected to the network. There is only text input at some work stations (the so-called rappers) while the automatic composing and make-up take place in designated units. The results of this can be checked and changed on a high resolution, graphic screen. One of the intelligent units also schedules the material to be projected and carries out dispatcher functions.

The Text Input Device (Rapper)
This serves to enter prepared or unprepared infinite text. It is suitable only for execution of proof sheet instructions.

Its chief characteristics are: 64 K bytes RAM; 24 K bytes ROM; 80 x 25 character monitor; it can store 256 characters, of which 128 are fixed and 128 can be changed by the user; one 5 1/4 inch floppy disk unit (double-sided, double-density).

The keyboard also has push buttons for input of special printing industry instructions.

There is also a printer interface and an asynchronous data transmission interface and the machine has an operating system to operate the hardware.

The Composing-Makeup Terminal
It performs automatic composing and make-up on text input with instructions, it does the necessary corrections and produces the data for the projector.

Its chief characteristics are: 512 K bytes operating memory; 80 x 25 alphanumeric display; 256 characters, 128 fixed and 128 loadable; 27 M byte Winchester disk store; two 5 1/4 inch floppy disk units; a special printing keyboard; printer interface; local network coupler; matrix printer.

The Graphic Composing-Makeup Computer
This is a version of the above device supplied with graphic options which make possible checking and changing of the composed, made-up text image at various comfort levels. It can be used in parallel with an alphanumeric screen but at the price of reducing the graphic part of the screen the customary monitor tasks are performed on the lower 24 lines of the screen.

The possible operations are:
--text display at various magnifications (zoom);
--light bridge display (the letters cannot be recognized but one can see the length of the lines and the placement of the words);
--display of column dimensions; these can be moved and their dimensions changed.

The graphic screen has a resolution of 780 x 930 points, its background corresponding to 1024 x 1024 points.

The equipment can display a number of types of letters in different sizes. So here there is a need for bit mapped letter images in addition to the letter width needed with the previous equipment; these images can be derived from the description of the letter sets used in the projector, according to the resolution of the screen.

Network Control

The network control has the task of controlling data flow among the several work stations in a multiple work station printing system, it carries out scheduling tasks and takes into consideration the priorities of the work stations in regard to transmission possibilities.

The Software of the Press Text Processing System

User programs provide for execution of text input, composing, make-up and rendering tasks. The operating system--in accordance with IBM PC type machines--is MS-DOS compatible and suitable for handling the special hardware elements or peripherals. In accordance with the modular structure of the hardware the software also consists of modular parts. If the user wants to expand his system he can do so simply by fitting the proper new software and hardware modules into the original system.

The Projector

The laser projector developed by ITEX is the last element of the photocomposing system. The final product of the entire process is a film which we get from the projector after development.

The projector has a capacity of 200,000 characters per hour, is cassette loaded and has a projection width of 200 mm. The projector gets its input data from the composing-makeup station. In addition to a job identifier this data file contains identifiers or coordinates for the elements of the material to be projected.

The other input data file for the projector is the letter set description (font descriptions) figuring in the job.

The font description contains the sizes of the letters and symbols, the bit mapped letter images and the equalization matrix.

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HUNGARIAN LASER OPERATED DRAFTING MACHINE, LG-1

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 21

[Text] The first domestically developed, large capacity, raster graphics laser drafting machine will go on the market this year, manufactured and sold by ITEX.

The demand for OEM equipment suitable for producing especially fine resolution drawings arose with the perfection and spread of computerized designing and image processing procedures. Beyond certain limits these procedures lose their power if the systems cannot be supplied with drafting machines capable of producing the results, drawings rich in detail and sometimes containing vast volumes of information, in perfect quality as "hardcopy" suitable for further use.

As its name indicates the LG-1 is laser equipment, so it works on light sensitive material, film or photopaper.

The film format is a maximum of 500 x 600 mm, on which the maximum size of the drawing can be 480 x 540 mm. The image is fine resolution raster graphics. The resolution is 25 microns, that is 40 lines per millimeter. There are no shading values in a raster point--only 0 and 1 can be interpreted--so at this resolution one can only prepare line drawings. But by relaxing the resolution, not technically but on the drawing side, and using larger pixels built up of elementary raster points one can produce shaded drawings; 16 density degrees can be interpreted in a 0.1 mm raster network.

It is characteristic of raster graphics devices that the speed of drawing is independent of the quantity of image information, the density of the figures or the length of the lines. It follows from this that when drawing complex figures raster graphics definitely increase performance. The LG-1 produces a full format in 8 minutes; one can place several smaller figures side by side on large size film in one cycle. The device works with cut to size, cassette loading film, with semi-automatic film advance. The cassettes are loaded in a dark chamber but operation of the machine does not require a dark chamber.

The input data format is a packed bit map, so it accepts and draws all structures generated on a computer following the format.

Its structure and principle of operation can be summarized briefly as follows.

The beam emitted from a 5 mW He-Ne laser proceeds through an acousto-optical crystal. In the crystal ultrasound separates the beam into eight independent rays which are simultaneously modulated separately according to the current image information.

The eight modulated laser rays emitted by the crystal go into an optical system. The last element of the optical system is placed on a slide moved by a ball spindle and driven by a stepping motor.

The slide moves in the generating direction in stepped fashion along the film stretched on a turning drum. A revolution of the drum belongs to each position; during one revolution the eight laser rays simultaneously draw eight raster lines one beside the other. After the cycle the slide moves on.

An incremental angle-data transmitter senses the momentary position of the drum and the system is synchronized by the signals received from here.

Piezoelectric crystals excite the ultrasound, controlled by an eight channel, frequency and amplitude controlled high frequency unit.

The finished bit map reaches the input of the high frequency block in digital form. A fast special purpose processor produces this bit map from the packed input format in addition to supporting operations with a few other functions.

In offline mode the LG-1 is fed from magnetic tape; in online mode it can be connected to an IBM PC/XT and AT or compatible computer.

As an option they offer a program package for the drafting machine which serves primarily to produce the films needed to manufacture printed circuits. The packed bit map of the raster description in input format is produced from vector documentation designed in CAD systems or put on a computer by various devices. There are two versions of the program. One, the GTLPD, can run on ESZ 1035 or larger computers; the other, micro-GTLPD, can run on IBM PC/XT, /AT and compatible models.

The machine is at the world level and can count on interest on the capitalist market as well. Development and the research preceding it was done by the MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] with considerable material support from the OMFB [National Technical Development Committee].

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STATUS OF 16, 32 BIT MICROCOMPUTERS IN SOCIALIST COUNTRIES

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 pp 24-25

[Article by Peter Broczko: "The Socialist Market; 16 and 32 Bit Microcomputers"]

[Text] In our previous issue we reviewed in detail the market for IBM PC compatible computers of the socialist countries. In this article we will deal only with those 16 bit microcomputers which represent a line diverging from that. At the same time we will review the status of manufacture of 32 bit microcomputers.

PDP

The first 16 bit microcomputer of the socialist countries, the Soviet Elektronika 60 which corresponds functionally more or less to the LSI 11/03, was made at the end of the 1970's. It has been sold in our country since 1980 by ITV. Nearly identical machines of other socialist countries soon appeared using the same K1801VM1 Soviet made microprocessor--the Polish Mera 60 in 1982 and the Bulgarian BK 1302 and the Czechoslovak SMEP PP 04 in 1983. The Romanian Coral 4001 which appeared in 1983 uses the American AM 2901 microprocessor but at the 1984 Leipzig Fair, for example, the Coral operating system on a floppy disk from the Romanian stand came up without a problem on the Mera 60 computer being exhibited there. Since 1984 the Polish Mera 60, the Bulgarian Izot 1039 introduced in 1984 and the Bulgarian Izot 1060 introduced in 1985 are made with the new, larger capacity K1801VM2 microprocessor. The latter is the first microcomputer image processing system of the socialist countries. It is a product of international cooperation. In addition to the Soviet Union the SZKI [Hungarian Computer Research and Development Center] in our country had a role in its development, partly with software development and partly by interfacing its printer.

The year 1982 brought a new Soviet top product, the NC 80.01 D single card 16 bit microcomputer about equivalent to the LSI 11/04 which at the time worthily merited the grand prize at the Budapest International Fair. The first finished product based on this microelectronic element base (the Elektronika NC 80-20 microcomputer with peripherals) was introduced at the 1983 spring fair in Leipzig.

By the spring of 1983 our country produced computers based on the NC 80.01 D

single card machine, the Janus at the KFKI [Central Physics Research Institute] and the Mikrosztar at the SZAMALK [Computer Technology Applications Enterprise]. Last year the latter seemed to rise again under the name Mikrosztar 1103.

It is an interesting feature of the Janus and a unique characteristic among the PDP compatible microcomputers made in the socialist countries that in accordance with its name--meaning the god with two faces--it also contains a Z80 microprocessor on which the CP/M operating system runs. This means that it provides a relatively simple conversion possibility for users with the earlier 8 bit professional computers.

The experts expected that the 1982 appearance, and delivery, of a Soviet version of the AM 2901 bit sliced microprocessor would give new impetus to the development of manufacture of PDP compatible microcomputers in the socialist countries. A test shipment of them reached our country in 1984 and the quality was perfect. In regard to its performance this microprocessor is also suitable for building into minicomputers; for example, it could be used to make the TPA-11/440. At present its use dominates in the minicomputer line.

In general the socialist made PDP compatible microcomputers use versions of the RT-11 operating system adapted under various names.

Today the life cycle of PDP compatible microcomputers is unambiguously on the down side; the IBM PC compatible machines meant a powerful competition for them and are gradually forcing them from the market. The PDP compatible mincomputers on the other hand will count as consolidated machines for a longer time; only last year a new such model appeared at the DEC firm. But now machines functionally equivalent to the 32 bit VAX family, the new products of this firm started in the middle of the past decade and not compatible with the earlier 16 bit PDP, are beginning to appear in the socialist countries. The first version of these powerful megamini machines manufactured in a socialist country is the Czechoslovak SZM 1505, which was first shown to the public at the Brno fair last fall. As is well known, Bulgaria, the Soviet Union and our country are dealing with preparations for the manufacture of VAX compatible machines.

Intel 8086

Although we already touched on this theme in part in connection with the IBM PC compatible machines there are two models made in socialist countries which are not compatible with the IBM PC which are built on this microelectronic base.

The first and so far the only 16 bit microcomputer of Romania, not PDP compatible, the M 216, belongs in this category. It was first shown in the spring of 1984, at the Budapest International Fair. Its operating system is ISIS, which they adapted under the name SFDX. The interesting feature of the machine is that it also has an 8 bit face; it also contains an Intel 8080 microprocessor on which the CP/M operating system runs.

In the fall of 1984 Bulgaria introduced at the Plovdiv fair the Izot 1030 machine, which corresponds to the Intelec III and is made with a Soviet made version of the Intel 8086 microprocessor.

Taking into consideration the present trends this branch will probably be absorbed into the line of machines compatible with the IBM PC and this microprocessor type will be used there in its entirety.

Z8000

One could see the first machine manufactured in a socialist country with this type of microprocessor at the Leipzig fair in the spring of 1984. It did not contain the original Z8000 microprocessor but rather a functional equivalent made in the GDR under the name U8000.

Since then the manufacture of machines with such a microelectronic base has been dealt with outside the GDR only in our country, more precisely at the MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences]. The VM 02 form recognition robot was made in 1984. Last year's achievements included the Cosy Fama and the Cosy Famulus and the VM 03 form recognition robot. All of them use the GDR made U8000 microprocessor.

At the Leipzig fairs last year and this we could see a GDR machine based on the U8000 as a finished microcomputer. This meant making "two-faced" the A 5120 microcomputer which operates in our country also in relatively large numbers. Thus, in addition to the previous Z80 (U880) microprocessor and the CP/M like SIOS operating system it also contains a 16 bit microprocessor. The model designation of the new machine is A 5120.16.

The Z8000 based machines in our country and in the GDR run with adapted versions of the UNIX operating system, which is called HUNIX here and MUTOR-U in the GDR.

Despite its outstanding properties the Z8000 microprocessor itself was not able to win a suitable market position in the developed capitalist countries because the large microcomputer manufacturers cast their vote for other microprocessor types. For this reason this trend does not appear to have very great prospects despite the fact that at the user level one cannot note any serious difference between them despite the different microelectronic base, since all use the UNIX operating system.

Motorola 68000

The first domestic machines using the Motorola 68000 base, also the first among the socialist countries, appeared in 1984--which meant a quasi 32 bit architecture. The interesting feature of this microprocessor is a memory addressable to 16 M bytes, which remains for us even today only a theoretical possibility.

The Professor computer of the Comproject GMK [economic work association] is a megamini in regard to its capacity; it is recommended for use primarily as a terminal concentrator. The Instrument Technology Small Cooperative offers several models on such a microelectronics base. These include the Transmic 16, the first and so far the only domestically made 16 bit portable machine. The

modular assembly possibility of the TM-16 is emphasized in its name. The Multi Workstation is a multiple work station machine offered primarily for local networks. The IM 16 also contains an Intel 8088 in its line of microprocessors. Series manufacture of the Videoton VT-32 is expected to begin this year. The first Motorola 68000 based machine of the socialist countries not made in Hungary appeared this spring. This is the Bulgarian Interlab 1600 serving to control a Camac network. The Interlab 1610 general graphics machine and the Interlab 1620 oriented toward circuit design will appear this year also.

All the Motorola 68000 based machines mentioned use the UNIX operating system. It is of special interest that using UNIX working under the name SOS on a VT-32 the MTA SZTAKI has already generated a color graphics system meeting the international GKS (Graphical Kernel System) standards, a color graphics system developed by it and intended primarily for the Western market.

With its powerful performance the prospects for the Motorola 68000 were made very hopeful by the development of market conditions up to February of this year. But the appearance this year of a new IBM PC/RT family using the Intel 80386 microprocessor has made the future of the Motorola 68000 microprocessor uncertain. It is early to make predictions but it cannot be ruled out that there will be a repetition similar to the "setting aside" of the Z8000 and the Intel 8086.

Number of 16 Bit Microcomputer Types of the Socialist Countries By Year

	1979	1980	1981	1982	1983	1984	1985	1986 April	Total
IBM PC compatible machines	--	--	--	--	1	13	24	7	45
Not IBM PC compatible machines	1	--	--	1	6	4	5	--	17
Total	1	--	--	1	7	17	29	7	62

16 and 32 Bit Microcomputer Models of the Socialist Countries (not counting IBM PC compatibles)

Country	16 Bit Prototype of Microprocessor			Number of Models	Quasi 32 bit prototype	Number of Models	Total Models
	AM 2901	Intel 8086	Z 8000		Motorola 68000		
Bulgaria	BK 1302 (1983) Izot 1039 (1984) Izot 1060 (1985)	Izot 1030 (1984)		4	Interlab 1600 (1986) Interlab 1610 (1986) Interlab 1620 (1086)	3	7
Czechos.	SMEP PP 04 (1983)			1			1
Poland	Mera 60 (1982)			1			1
Hungary	Janus (1983) Mikrosztar (1983)		VM02 (1984) Cosy Fama (1985) Cosy Famulus (1985) VM03 (1985)	6	Professor (1984) Transmic 16 (1984) TM 16 (1984) VT-32 (1984) Multi Work-station (1985) IM 16 (1985)	6	12
GDR			A 5120.16 (1985)	1			1
Romania	Coral 4001 (1983)	M 216 (1984)		2			2
Soviet Union	Elektronika 60 (1979) Elektronika NC 8020 (1983)			2			2
Total	10	2	5	17		9	26

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PRIVATE IMPORTS ON HUNGARIAN HARDWARE MARKET

Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 2

[Unsigned article: "Private Import on the Hardware Market"]

[Text] In the years 1983-85 the number of microcomputers brought into the country by travelers was 65,899 with a customs value of 1,295 million forints.

The ratio of microcomputers in the 10,000-30,000 forint value category continues to be highest in both quantity and value. This value category contains more than 78 percent of the machines brought in, that is 51,541 units.

Despite the fact that the number of machines in the higher value category increased in both 1984 and 1985 (for example, from 130 units in 1983 to 264 units in 1985 for the value category above 90,000 forints, increasing to a total of 537 in the three years) their ratio makes up only one percent.

Machines listed in the category above a customs value of 50,000 forints--which can be called professional microcomputers--make up 1.1 percent of the number brought in and make up 22.5 percent of their value.

The domestic trade value of the devices brought into the country by travelers in the years 1983-85, comes to 2,866 million forints calculated on the customs value of the devices. (We increased the customs value by 55 percent to estimate the lower limit of the trade value; this contains the duty and a 15 percent profit margin.) This breaks down as follows: 2,069 million forints for microcomputer central units, 299 million forints for peripherals and 498 million forints for software and other tools.

The microcomputers brought into the country in 1983-85 represent 75 models. Even with a decreasing import the Sharp computers continue to be the most common, making up 54.5 percent of the total volume and 35.1 percent of the customs value. (These ratios were 72.4 percent and 72.5 percent respectively in 1984.) The Commodore and Sinclair models are also significant; the ratio of these increased greatly compared to 1983 (the former type 31 times and the latter 5 times).

On the basis of the data for the 3 years the six types in the table were the most common among machines brought in by travelers. These account for 98.3 percent of the units and 79.7 percent of the customs value. The remaining types make up 1.8 percent and 9.3 percent of the machines brought in respectively. The latter come to 1,135 units with a value of 276 million forints. In 1985 there was a great increase in the import of Atari and IBM PC models--although volume did not reach 100 units. The customs value of the 88 IBM PC's was 151 million forints and that of the 68 Ataris was 2 million forints.

Data on Computers Brought In In Quantities Greater Than 100 Units

Manufacturer	Units	Percent of All Machines Brought In	Customs Value in 1,000 forints	Customs Value in percent of total
Casio	561	0.9	7,206	0.5
Commodore	12,410	18.8	365,438	26.9
MBO TRS	287	0.4	3,506	0.3
Sinclair	10,084	15.3	221,278	16.3
Sharp	40,730	61.8	476,928	35.1
Texas Instruments	692	1.1	10,278	0.8
Total	64,764	98.2	1,084,634	79.7

The peripherals and other computer technology tools brought in by the same means increased the equipped nature of the computers. The trade value of this in the import for 1985 came to 7,600 forints per computer. The number of peripherals brought in increased nearly six times compared to the earlier years.

The Ministry of Finance provisions concerning duty concessions for microcmputers brought in by travelers proved effective; the reduction in the duty value also increased import. The import had a great effect on the development of domestic prices. In the years studied the domestic prices for the machines figuring in the import fell to one half or one third.

As a result of the concessions provided the import of microcomputers by travelers increased in 1985 by 87 percent compared to 1983. Twelve thousand more machines were imported in 1985 than in 1983. It is a favorable phenomenon that with the significant quantitative increase the number of types changed only slightly (41 types figured in the traffic in 1983, only 29 types were brought in in 1984 and 23 types in 1985).

The ratio of higher performance machines was 13.6 percent higher than in 1983. Within this, for example, the increase was 515 percent in the 50,000-70,000 forint value category, 40.7 percent in the 90,000- 999,000 forint value category and three times in the category exceeding one million forints. The import of peripherals, auxiliary hardware and software products increased significantly compared to previous years; their volume in 1985 exceeded the previous year by 40.9 percent (and was higher than in 1983 by 830 percent). The volume coming into the country by this channel in 1985 was nearly six

times greater for peripherals and nearly five times greater for various software products.

Of the microcomputers brought into the country by travelers in 1983-85 about 18,068 computers--with a customs value of 508 million forints--are presumed to have gone to managing organizations (including small cooperatives). The average domestic trade value of these microcomputers is 58,000 forints per unit. (We estimated the number of machines which can be used for economic purposes by the number of machines exceeding a customs value of 15,000 forints.)

We estimated the number of computers being used by the populace by the number of machines with a customs value of 15,000 forints or less. These make up a significant proportion of the microcomputers brought in by travelers, and number 46,920 units. (The customs value of this quantity is 159 million forints, giving a domestic trade value per machine of 18,000 forints.)

The import of microcomputers by travelers began essentially in the past 2-3 years. The import through this channel of machines used by the populace picked up following the favorable customs provisions. In the years studied the domestic trade price of microcomputers was substantially higher than the calculated domestic trade value. In general the more expensive machines with a higher customs value were traded at the customs value while a price higher than the calculated domestic trade value was realized for the cheaper machines. Original IBM machines were sold at a price two to three times higher than compatible machines which were not original IBM machines. Because of the small scale of domestic purchases for popular use we can estimate the number of machines used by the populace primarily by the travelers' import, as the chief source.

Presuming that in 1982 the import of microcomputers for popular use came to half of that in 1983 we can estimate the number of microcomputers owned by the populace. By the end of 1985 there were 53,000 units of such computer devices from this source owned by the populace; taking into consideration other sources (domestic manufacture and sales, import on which duty was not paid, etc.) this figure may have reached 100,000 by the end of 1985.

Distribution of Microcomputers Brought In By Travelers (1983-1985)

Customs Value in Forints	Quantity (percent)	Customs Value (percent)
--10,000	20.31	8.19
10,001--30,000	78.21	68.57
30,001--50,000	0.38	0.69
50,001--70,000	0.21	0.62
70,001--90,000	0.08	0.29
90,001--999,000	0.66	7.92
Over one million	0.15	13.72
Total	100.00	100.00

Summary Data on Microcomputers Brought in by Travelers

Category	Units	1983	1984	1985	3 Year Total
Computers	each	13,957	25,807	26,135	65,899
Types	each	41	+11	+23	75
Customs value of central units	1,000 ft.	229,208	436,030	629,500	1,294,738
Customs value of peripherals	1,000 ft.	30,682	59,790	351,061	441,533
Customs value of other tools	1,000 ft.	10,465	15,374	31,393	57,232
Customs value of all equipment	1,000 ft.	270,355	511,194	1,011,954	1,793,503
Trade value calculated on customs value	1,000 ft.	419,049	828,134	1,619,126	2,866,309
Of this:					
Central units	1,000 ft.	355,272	706,369	1,007,208	2,068,849
Peripherals	1,000 ft.	47,557	96,860	154,980	299,397
Other tools	1,000 ft.	16,220	24,905	456,938	498,063

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STATUS OF COMPUTER EDUCATION IN POLAND

Warsaw RZECZPOSPOLITA in Polish 9 Oct 86 p 3

[Article by Tadeusz Podwysocki: "Computer Education: Man Must Be Prepared"]

[Text] It was enough for a school pupil or student of the pre-industrial age to have the body of knowledge considered necessary at that time crammed into his memory. When the industrial era began, it became necessary not just to burden the memory much more heavily with an avalanche of data and facts, but to learn how to derive benefit from these data. Now, in the computrer age, says well-known UNESCO expert Jean Thomas, when computers have in effect taken charge of all intellectual life through their impact on the consciousness of humanity, the new man born in the age of computer science needs a new education.

A similar line of reasoning was followed at the extremely interesting and very well organized All-Polish Educational Technology Seminar recently held in Poznan and devoted to the subject of computerization in teaching and pedagogical research. This event was organized by Adam Mickiewicz University in Poznan and the Insitute of Educational Policy, Technical Progress, and Higher Education in Warsaw. The remark by Professor Heliodor Muszynski that, like printing and the steam engine, the computer marks a change in an epoch at the same time points up and confirms the thesis that the majority of people, and not just people in Poland, do not appreciate the essential nature of the process, which covers the entire world independently of borders and social systems.

Hence the central theme of this Poznan seminar attended by foreign specialists, namely, that man must be prepared for life in a computer-oriented society. This crucial question was discussed by Professor Tadeusz Lewowicki, director of the Pedagogical Research Institute in Warsaw. The computer is demolishing the old, traditional school, and we in education have the cardinal task of incorporating computer science properly into the educational process.

It is proper at this point to quote another important statement, one made in the Club of Rome report in connection with educational matters. "This problem is not whether the 80's will inaugurate an age of learning, but what kind of learning this decade will bring." Will preoccupation with educational matters lead to the education demanded by the course of events? And will society

be in a position consciously to develop and apply in practice the type of education suited to the computer age?

Beyond the Tips of Our Noses

It is extremely difficult to answer this question. We are witness in Poland to a great rush toward computers, especially by young people. Is it a fad? Should this attractive technology be regarded as just another form of amusement? At the same time, there is no shortage of schools in Poland in which computer equipment is kept under lock and key by the school director and, as was pointed out at the seminar, is shown to the students and teachers only on special occasions.

While the program of universal computer science education in Poland states that the computers in schools at the beginning of the 1985-1986 academic year numbered less than 1,000, according to information provided by Professor Waldemar Zukowski, prorector of Adam Mickiewicz University, the schools in Poznan Province alone today have 700 microcomputers.

It would obviously be a major error to fail to see beyond the tips of our noses in the process of applying computer science in education. After all, it is precisely microelectronics that is breaking down many barriers and making the majority of the world's problems global. Consequently, the question of computers in the school is one affecting the entire world. While in Hannover recently, at the largest computer science exposition of its kind, CeBIT '86, I heard it said at one of the seminars that if we want to overcome the educational crisis and the the phenomenon of "computer illiteracy," we must have universal computer science instruction at the intermediate educational level. At the Poznan seminar, one of the chairmen, Dr Franciszek Januszkiewicz of the Insitute of Educational Science, called attention precisely to the need for universal computerization of education in Poland.

"We must prepare the young person well for what the immediate future will bring," was Dr Januszkiewicz's conclusion. This is essential. According to estimates by specialists both in Poland and in other countries, by the end of this century about 70 percent of all employed persons will come in contact with microelectronics, and above all with computer systems. There is no turning back from this future. Even today there are more than 200,000 types of microcomputers in use throughout the world.

A Revolution in Education

It must be stated at this point, with complete honesty and responsibility, that the prospect of a computer in every school is fairly remote in all the highly industrialized countries, including the United States, Japan, and the FRG. According to United States data, the number of microcomputers in elementary and middle schools has risen from around 30,000 to more than 1 million since 1981, and there are to be more than 3 million of them by 1990. Only 20 percent of college students have computers of their own, and the middle school student spends 45 minutes a week with a computer.

On the other hand, more than 50,000 microcomputers are in use in French schools. The situation is similar in Great Britain. While I was in Japan recently, I observed the great pressure exerted by educational and industrial

institutions toward making computer education universal. More than 100 million yen have been allocated for outfitting schools with microcomputer networks. The digital satellite telecommunications system with videophone and facsimile equipment (for exact reproduction of documents and drawings), together with the microcomputer, presages a radical revolution in Japanese education. At a certain hour, all pupils and students take their places at videophone consoles connected to home computers. They can receive and participate in school lessons or university lectures without leaving their homes in out-of-the-way places. I am not speaking of the distant future. I have participated in these lessons. I have seen how a teacher can establish contact with each pupil and check his knowledge, and how the pupil can obtain advice and explanations.

At the "Junior" Level

It must be stressed here, approvingly, that we are not sleeping through the current important period of inauguration of total computerization, and not just computerization of education. A program has been drawn up for universal education in the area of computer science and introduction and application of computer equipment in educational processes over the 1986-1990 period. Two major processes have been distinguished in this important program. The first is thorough grounding of students and pupils at all levels of education, study, and occupational development in the basic elements of computer science. The second is gradual, constantly increasing provision of computer equipment for middle and higher schools, and later on elementary schools as well.

Computerization of schools is currently a haphazard process. There is a great variety of computer equipment, and the programs also leave much to be desired. There is hope, however, for introduction of a microcomputer specifically designed for educational purposes, the ELWRO-800 "Junior," under the government program. We now have an entirely successful design. This system is fully compatible with the CP/M system, version 2.2, which is the most widely used system throughout the world and one under which several thousand programs can be run. Hence there is no need to re-invent the wheel. Another great advantage of the "Junior" is JUNET, a local area network of microcomputers. As is pointed out by one of the designers, Pawel Krzysztofik, the ELWRO-800 "Junior" permits interaction of several dozen microcomputers.

As we know, networks make common use of disk storage and printers possible and enable a teacher to check the work of pupils and transmit programs from his microcomputer to pupils' terminals. Hence this is a very close approximation to the Japanese and other supermodern solutions for individualization of computer education. Under the ELWRO-800 "Junior" system, a teacher can copy pupils' compositions and check their knowledge, inasmuch as he has access to every pupil's monitor. In addition, information from a teacher can be transmitted to one selected pupil or to all of them, or again to a few selected ones. The transmission rate is 64 kilobytes per second.

According to the computer education program referred to, the ELWRO Electronic Plant in Wroclaw is to deliver around 5,000 "Juniors" in 1987, and 20,000 the following year, so that the production level of 250,000 complete microcomputer systems will be reached over the 1986-1990 period. Care must be taken to

see that the quality of the equipment and the promised volume of output do not becomes subjects of controversy. Quality is a very important problem in this process.

The computer education program for the 1986-1990 period indicates the need for outfitting schools with 75,000 complete microcomputer systems, including peripherals. If this rather ambitious and highly appropriate program is carried out, we will approach the 21st Century with our heads high, as a thinking, intelligent society well prepared for the new era.

And as we know, in the future intelligence, science, and preparation will become more valuable than coal, sulfur, petroleum or gold. The information age is approaching. Our gray cells here in Poland as well are earning the respect due them.

6115
CSO: 2602/5

EAST EUROPE/COMPUTERS

BRIEFS

UPGRADED ROSY SYSTEM--The capabilities of the text editing system of the Rolitron Technical Development Small Cooperative increased significantly recently. Among the new programs supporting the text editing program package the ROSYPRINT program makes possible so-called background printing, the ROSYCALC arithmetic program can do operations with numbers in the texts created and the ROSYLETTER program can be used when filling out forms and preparing serial letters. [Text] [Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 3] 8984

COSY INDUSTRIAL PLANNING SYSTEM--The COSY Technical Development Subsidiary of the MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] has introduced its IBM PC compatible professional personal computers, the Varyter XT and the Varyter AT, and a computerized industrial planning system (PcCAD). A new feature is that the county and Budapest computer centers of the KSH SZUV [Computer Technology and Management Organization Enterprise of the Central Statistics Office] will sell the Varyter computers and provide national service for them. [Text] [Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 3] 8984

KFKI'S VT-100 TERMINAL--A new item introduced by the KFKI [Central Physics Research Institute] is a picture screen terminal compatible with the DEC VT-100 and making possible use of the entire Hungarian alphabet. The terminal is connected to a TPA-11/170 computer. Graphic editing functions can be seen on this machine also. With the Kompakt office automation system they are introducing integration of telex management into an electronic postal service. [Text] [Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 3] 8984

NEW MOM DRIVE--The newest developmental achievement of the MOM [Hungarian Optical Works] is the MF 8000 floppy disk drive. This half-height peripheral uses double-sided, double-density 5.25 inch floppy disks. The number of bands per side is 80 and band density is 96 TPI. [Text] [Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 3] 8984

GANZ INSTRUMENT INDUSTRY NETWORK--The Ganz Instrument Works has introduced a conversational online terminal system. The enterprise has three SZM 52 computers among which there is a database link. Terminals with different levels of intelligence--dumb, Commodore-64, IBM PC--are connected to these

computers. The applications areas of the network are: a technical development planning information system, production programming, warehouse records, inventory management and production costing. [Text] [Budapest COMPUTERWORLD/SZAMITASTECHNIKA in Hungarian No 2, Oct 86 p 3] 8984

CSO: 2502/5

EAST EUROPE/FACTORY AUTOMATION

SOVIET-BULGARIAN 'KRASNIY PROLETARIY - BEROYE' ASSOCIATION

Sofia OTECHESTVEN FRONT in Bulgarian 25 Sep 86 p 1

[Article by correspondent Bonka Berova: "The Association Is Battling for New Market Positions"; under the rubric 'Company Address: USSR-Bulgaria. OTECHESTVEN FRONT AND IZVESTIA [report] on new forms of socialist integration'; first paragraph OTECHESTVEN FRONT introduction]

[Text] The Bulgarian-Soviet scientific manufacturing association will be represented for the first time at the Plovdiv Trade Fair at a joint display. The anthropomorphous robot and the small GAPS (extension not known) are of a high technical standard, the future of machine building.

The goods produced by the Bulgarian-Soviet Krasniy Proletariy - Beroe scientific manufacturing association will be on display this year at the autumn trade fair in Plovdiv. For the first time the company will have a special display. While the specialists assess what the designers, technicians and collectives in the new association have achieved, the managers of the association will attend their third regular meeting in Stara Zagora, where they will discuss the outlook and opportunities for bringing new ideas to market in a short time using high technical standards.

Given the constant improvement in cooperation, the dynamics in the complicated process from idea to design, development, construction and marketing, are the most direct routes toward the common goal. The organization of production at high technical standards, production that will successfully battle for new market positions, is a goal that has no room for red tape and hesitation.

In less than a year many new ideas have materialized in the association. Its products—automated technical systems—have already been set up in both the Soviet Union and Bulgaria. Control devices have been improved. This is a task of specialists at the Izot combine. This immediately means that total cooperation will be developed. Progressive improvement in quality has been observed in one of the most important branches that has to date created the most problems—component parts.

Flexibility has become the style in the organization of work at the association. Small and medium-size companies have been set up in a very short time. They will also be represented at the fair. Wool reducers from the Vulna small company—which, according to specialists, were the big hit at last year's fair—are an example of how high-quality Bulgarian goods should be produced with world-class Bulgarian technology.

The present and future of the Krasniy Proletariy - Beroe scientific manufacturing association is the association's main theme at the fair. It dominates all the exhibits. Robot-operated systems, produced on the basis of highly efficient computer-driven Soviet machinery, a robot and flow operator, automated equipment for processing mill components, and plasma guns will attract interest.

A robot-operated system for diamond cutting is intended for use in advanced treatment of magnetic disks. The diamond-cutting equipment manufactured at Krasniy Proletariy, the two-armed industrial robot RB-120 produced at the Beroe combine, vacuum cleaners and peripheral devices for blanks and finished components, assembled in the complex, provide a number of advantages and ensure high-quality production with maximum facilitation of the operator's work.

The introduction of robot-operated equipment for jet-particle cleaning of components after heat processing will ensure a sharp reduction in pollution in workshops. Cleaning will be accomplished by a pneumatic jet of steel, cast-iron particles.

According to specialists at the Beroe combine, the latest developments at the exhibition in Plovdiv are the anthropomorphous robot and the two-armed loop electromechanical robot or, as we call it here, "the small GAPS with great possibilities."

The mechanical system of the anthropomorphous robot is built on a module principle and consists of five modules with five degrees of mobility. The industrial loop robot, RB-282, has electromechanical movements along all axes of movement and has wide application. It is intended for automated maintenance of metal-cutting machines and the construction of independent automatic technical modules. Its potential allows it to be built into conveyor belts.

From this autumn's Plovdiv Trade Fair the Bulgarian-Soviet company will set out on its own journey to other technology exhibitions and will battle for new positions. The first steps, the first strides, inspire hope.

12907/12859
CSO: 2202/6

EAST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

DETAILS ON USSR-BULGARIAN 'IVANOVO-SOFIA' CONNECTION

Sofia POGLED in Bulgarian 6 Oct 86 pp 1, 8, 9

[Interview with Vladimir Kabaidze, conducted by Eva Kostova, date and place not given]

[Text] Yegor Ligachev, Politburo member and secretary of the CPSU Central Committee, said of him at the 27th Congress of the CPSU that in the end innovators and enthusiasts such as Dr Gavril Ilizarov of Kurgan and machinebuilder Vladimir Kabaidze generally reach their goals.

They reach it because they love to work and because they are supported and actively assisted by the Communist Party. POGLED reported on them immediately after the congress. We have now had the opportunity to conduct a "live" interview with Vladimir Kabaidze, who was recently in Bulgaria in his capacity as general director of the Ivanovo Machinebuilding Association and of the Ivanovo-Sofia international scientific production association, the first such organization within the framework of CEMA. In July the Politburo of the CPSU Central Committee heard the reports by Vladimir Kabaidze on the development and building of machining centers, which are flexible manufacturing modules and systems used in operating the Bulgarian-Soviet association. Emphasis was placed on the great promise of this form of cooperation and scientific-technical collaboration. As a matter of fact, the Ivanovo-Sofia is currently the latest stage in eternal Bulgarian-Soviet friendship. Hence the following was the first question asked of Vladimir Kabaidze.

[Question] What is the Ivanovo-Sofia now?

[Answer] An example of rearrangement of the mechanism of economic cooperation today, an expansion of direct production links between the enterprises and associations of the socialist countries. It means higher quality and skill of workers and specialists, world level standards, and successful movement forward together with friends.

[Question] We are eager to hear what you have to say about the Politburo meeting.

[Answer] Our parties expressed enormous confidence in us and told us to proceed. When he heard my information, Mikhail Gorbachev asked me to tell

him definitely whether Ivanovo-Sofia would create 2 1/2 times more machining centers during the 12th 5-year plan. I replied that it would. I sensed that the Politburo members were greatly interested in our plans and actively pledged themselves to promote our common cause. We are currently developing lathes which the plan does not call for and which are not as yet produced either in the Soviet Union or in Bulgaria. They are unit-head machining centers, grinding machining centers, laser machining centers, woodworking centers, and so forth. By the lowest estimates, we will save the state 7 million gold rubles in 1987. This integration enables us to cooperate with other associations in Bulgaria as well. I am convinced that on the basis of our cooperation we can produce lathes such as have never been made before in the world. The Politburo fully supports our bold plans. But the main conclusion I have drawn from the meeting is that we can make no postponements.

I did not have to start from scratch with our Bulgarian colleagues. I already knew a number of your specialists. I believed in them, and they had confidence in me and my command, so to speak. And so everything began with our purely personal relationships, which later became the technical links between Ivanovo and the Metal Cutting Machines Plant in Sofia. Everything began at a personal level.

[Question] Tell us honestly, how well are the Bulgarians in Ivanovo-Sofia working? Is there anything you would like to ask of them?

[Answer] Their work meets the standards, just as I had foreseen. As regards what I might have to ask of them, pace is the most important thing. Speed, speed, and more speed. My Bulgarian friends do not always work as fast as they could. Things must be speeded up. Such is life. Not coincidentally, our parties are now laying stress on acceleration, on reaching a turning point. Machinebuilding is at the center of this acceleration. And the center of machinebuilding is Ivanovo-Sofia.

[Question] What is the outlook in this direction?

[Answer] As I have already stated, we must increase manufacture of machining centers by a factor of 2.5 during the 5-year plan, at the minimum. I have a larger figure in mind, but this figure makes no allowance for the resistance of the bureaucratic apparatus, Soviet and Bulgarian. If this resistance were lower, our performance would be better.

A second and no less important point is the long product list of our association. We make a large number of machines.

[Question] What do you have in mind in speaking of bureaucracy?

[Answer] There is nothing analogous to the joint Soviet-Bulgarian association in socialist practice. New approaches and initiatives are not always in keeping with old requirements, concepts, and instructions. On the one hand, this is understandable, but new developments have not yet found suitable new defensive armor, either in the area oftechnical documentation or in financial or other problems. For example, the two governments set up a financial fund for us, but the old procedure for registering disbursements is still in effect, and this causes us to lose months. Or again, I am

authorized to assign specialists to Bulgaria at my discretion, but approval for travelling expenses is held up in another department. And as a director of an international firm, I do not have a travel allowance fund available to me. For almost a year now we have been receiving promises at the foreign trade bank that something will be done for us. We are trying to have changes in made in technical documentation procedures. We discuss, specify, and negotiate. As general director, I try to do one thing, but I am told that it cannot be done. Every document has to be coordinated at least with a deputy minister. Along with the designers, engineers, and workers we have suffered through these difficulties and we have overcome them. I naturally could not fail to report this to the Politburo, and I was very gratified to be able to report later to the staff that the Politburo had issued specific instructions to the appropriate ministries and departments for expanding the new forms of cooperation and speeding up socialist economic integration. But major authority entails heavy responsibility. Confidence must be justified by deeds.

[Question] But who is Vladimir Kabaidze, aside from the fact that he was born in Georgia in 1924, his wife is a physician, and he has 2 sons, one of whom is following in his father's footsteps?

[Answer] Probably one of the biggest ruffians, both in jest and in earnest, definitely because my style is somewhat unconventional.

[Question] But that's good.

[Answer] It is for some but not for others. My partners like it, but the bureaucratic system isn't always fond of it.

[Question] And what is this style of yours?

[Answer] I do not like obstacles between departments, when there are many levels of authority between manufacturers and consumers. I cannot tolerate these obstacles. We should operate horizontally, and not through a vertical hierarchy of management. This is how the Ivanovo-Sofia was established. This is my fetish, operating horizontally.

[Question] Do you still seem to some to be a crank?

[Answer] By and large, yes. In my opinion, technical progress is what sets eccentrics in motion. At first no one believes them. They have 2 options. One is to tell the truth but not to demonstrate it. The other is to tell the truth and also prove it. That is what the real creators of technical progress do.

At first it was not believed that the first Bulgarian-Soviet association would become a reality, but in its brief existence the skeptics have been proved wrong.

[Question] Aren't you hampered in your work by the principles and concepts with which the people of your generation were once long and diligently indoctrinated? Did something like this happen to you?

[Answer] I didn't lead a sheltered life. I was 18 years old when the war broke out. I went from the 9th grade in school into the army. At 18 I was an officer, and in the infantry at that. I was wounded 3 times. My survival, whether I was to live or not, was determined by pure chance. Statistically, only 1 percent of my class survived. Losses in the infantry were 3 times higher than the average. Out of a thousand, I was the only one to survive. Imagine: all the others fell, and I am the one out of a thousand who lived on.

[Question] Yes. Some time ago I read your reflections on labor. Every thought reads like an aphorism. Take one example, "the ability to take risks is one of the important conditions for changing one's way of thinking." But what are risks today?

[Answer] Innovation always involves risks. Switching production that has been tested and well-proven for years onto a new track is a major headache. At Ivanovo we currently are starting up mass production of complicated, unique machines directly from the drafting table, from scratch, as the saying goes, without going through the experimental model stage. And these are machines which are bought by Sweden, Japan, and the FRG. Believing in the company: that is risk. But it is not recklessness. Risk is rather a way of working under the merciless pressure of time when there is not enough of it. The pressure of time. That is what risk is, conserving time.

Every time we work directly from the drawing board, I plot on the chart my argument as engineer and manager and stake the authority of the enterprise, which is very high in the country, but every time I take a risk, I take it in the name of higher interests.

The risk show itself every day. It is not a one-time affair. It is like walking along the blade of a knife. We have become used to it. It is as if the skill of the manager and engineer is to risk after careful consideration, to make a steep but well calculated risk. No, this is no paradox.

[Question] In other words, risk is transformed into an adventure. "But the right to risk"--precisely your words--"is not presented as a gift; it must be earned." How?

[Answer] By work. By giving proof. There is no other way. This is why our specialists and foreign ones trust each other and why they buy from us. Naturally, I can't deceive them. They would not trust me a second time.

[Question] I quote Kabaidze again: "All this has been based on confidence in the people with whom I work." These aren't just fine words, are they?

[Answer] We work without the right to make mistakes, like combat engineers. People who move around in the ordinary work routine know that we take risks. Even many of them condemn us. That is wrong. The correct thing to do is to work in a new way. If we make only one mistake, they are happy. They say "well, you shouldn't have taken the risk." And the mistake is not just mine or that of the association. But wasn't there confidence in Ivanovo-Sofia at the beginning?

[Question] What do you most often talk to the staff about?

[Answer] It is a highly respected staff, one that has received awards and has been singled out for attention by one person or another. It has been somewhat spoiled. Consequently, I often say, "Let's stop, take a look around, and then move on." The principle we follow is not just to come up with ideas, but also to make decisions. We make machines which no one has ordered and which have not been prescribed "higher up." We ourselves move from an idea toward production and the consumer. This is the way our entire staff has been trained to be, and is something accomplished by the people of Ivanovo-Sofia.

[Question] Let's begin with the cadres and continue with what they have and impart as knowledge and skill. After all, you have 4 times as many designers as the most famous companies throughout the world in this sector.

[Answer] Learning-intensive production requires harnessing of greater creative potential, a high expenditure of engineering work. It is a great honor in our organization to be a designer, to work in scientific directions. And at all times we devote primary attention precisely to these directions.

[Question] When the technical level of products is low, whom do we blame?

[Answer] Only the engineers. The workers are never to blame. And I am truly convinced of this.

[Question] Never?

[Answer] Yes, never. We have wonderful workers, both in the USSR and in Bulgaria. It is the duty of the engineers to show them and convince them. But the work must also have a high goal. Then the work will go smoothly.

[Question] As a matter of fact, with the same workers and specialists you took the tremendous step from backward product to articles meeting the highest world standards. And yet, if you had to choose, what kind of people would you prefer to work with?

[Answer] With combat soldiers.

[Question] During the meetings in Stavropol' Kray, Mikhail Gorbachev brought up the point that engineers in the Soviet Union have considerable education but are not outstanding in their thinking and the results they achieve. In your opinion, what is the reason for this rebuke?

[Answer] We do indeed have a large number of engineers, and in my opinion so does Bulgaria. It is as if there were inflation in this high calling. But the prestige of this profession cannot be enhanced artificially, by decrees and orders. Only work can do this.

[Question] According to my information, the average age of designers is 32. How do you work with young specialists?

[Answer] Many people think young people are no good. This is nonsense. They are no good only wherever they are not given true work. In our

organization, for example, the most active force, the chief designers, are in fact young people. The chief electronic engineer, Sasha, is only 29, but he has been around the world already. He works like a horse. There are many like him. They called on him some time ago to work in various places in neighboring countries, where the work intensive from beginning to end of the work day but the pay was higher. In our organization now the salary is also higher, but there were more than a few difficulties when we were developing these best of machines. To my credit, no one has become greedy and left for higher pay.

[Question] Another problem was brought up during the most recent meetings between Mikhail Gorbachev and Soviet workers. Much is being accomplished in the way of reorganization in the economic area, but there is a lag in reorganization of attitudes. Isn't there a gap between the material and the psychological?

[Answer] There unquestionably is such a danger. True attitudinal values are bound up with higher interests and with whatever is the goal of these interests. I can't give general advice, but I do know how we do things. We offer the people drudgery. Yes, drudgery, difficult, exhausting, but interesting work. And, you know, the people respond with pleasure and then feel themselves to be fulfilled as persons.

Loafers do not prosper in our organization. The strong survive in the struggle for existence. Something like this happens in our organization. Such an atmsophere is created at work that the loafer goes away of his own accord.

[Question] If a POGLED journalist were to decide to go to work for you, what would tell him first?

[Answer] The work is done with no advance assurances. We sometimes make decisions without asking questions. We have earned this right for ourselves. But we ourselves are responsible for everything we do. All initiative is welcomed in our organization. We need it at all times, both among the rank and file and in management. We also follow another principle. We work as volunteers.

[Question] What is your opinion of the future of this qualitatively new cooperation between our fraternal countries?

[Answer] We will have other new associations like the Ivanovo-Sofia. The concept will be further developed. However, it is not altogether a question of issuing orders at the top. It will depend on the initiative of the partners. There must be community of aspirations, inasmuch as scientific production associations are not ends in themselves, that is, associations for the sake of having associations. They must have a specific goal and move toward it with well-trained people. There must be dedication to reaching the goal.

[Question] Finally, 2 questions that are not exactly new but must be asked. What do you like the most?

[Answer] Machines, fine ones.

[Question] And what don't you like?

[Answer] Passiveness.

[Question] What is your boldest idea thus far?

[Answer] Ivanovo-Sofia.

This interview with Vladimir Kabaidze was conducted before he visited the autumn technology trade fair. We learned from specialists the laconic opinion of this man who is sparing in favorable assessments after he had viewed the latest products of Bulgarian machinebuilding in Plovdiv, a cross-section of modern industrial technology and up-to-date electronic equipment: "You can go anywhere in the world with these machines."

6115
CSO: 2202/4

EAST EUROPE/SCIENTIFIC AND INDUSTRIAL POLICY

PLANNED DEVELOPMENT OF CSSR MACHINE-BUILDING INDUSTRY

Prague STROJIRENSTVI in Czech No 8, Aug 86 pp 417-419

[Article by Eng J. Jalovec, manager of the press and advertising department of the Federal Ministry of Metallurgy and Heavy Engineering in Prague: "The Role of Heavy Engineering in the Fulfillment of Decisions of the 17th CPCZ Congress"]

[Text] The 17th CPCZ Congress outlined a program for the further development of our socialist society to 1990 and an outlook to the year 2000. It is a constructive program whose strategic objective aims at systematic intensification of the dynamism of national income by a minimum of 3.5 percent annually. This will provide the economic foundation necessary for the satisfaction of our society's material and cultural needs.

In order to implement the Eighty 5-Year Plan, the economic management of the FMHTS [Federal Ministry of Metallurgy and Heavy Engineering], under the leadership of comrade minister, Eng Eduard Saul, prepared specifications of decisions proclaimed by the 17th CPCZ Congress for the ministry's intensification program and a prognosis of its development up to the year 2000. This programmatic document is essentially a system of 130 long-range tasks and systematic measures. Its objective orientation is derived from "The Main Directions of the CSSR Economic and Social Development for the 1986-1990 Period and Its Perspectives to the Year 2000," approved by the 17th Congress, which assigned above all the following tasks to the branch of heavy engineering:

--to expand its production and to deliver advanced modern technology, including efficient semiconductors and heavy-current electric products for the development of individual branches of the national economy and for the conservation of fuels, energy and metals. To improve planning and assembly capacities;

--to deliver the VVER 440 and 1000 equipment for nuclear power plants. To upgrade the quality and technological parameters, and to supply the required volume of technological components for coal mining, processing equipment, machinery for power, chemical and food production, sewage treatment systems, electric locomotives, suburban pantograph units, streetcars and trolleys, equipment for small-scale chemical production and agricultural irrigation. To accelerate modernization of facilities manufacturing equipment for boiler rooms of central heating systems; to deliver low-capacity boilers for low-grade coal burning, and equipment for air and water purification, etc;

--to increase the share of electronization and automation in the line of machinery and equipment for investment projects; to improve their operational reliability and efficiency;

--to introduce more new, advanced technologies, especially machine tools; to automate welding, rolling and forging processes; to develop engineering and power metallurgy; to accelerate the dynamism in the development and production of converter elements, pumps, armatures, aerotechnical devices, pipeline distribution systems, and spare parts;

--to fulfill obligations stemming from long-term trade agreements with socialist states. To expand exports to nonsocialist countries, particularly exports of investment units.

The directives for our socio-economic development in the Eighty 5-Year Plan will be fulfilled mainly by increased labor productivity whose current level reflects the progress of R&D. It is a challenging task, especially if we consider that even our technological development is affected by the complexities of the current stage of development.

Only machinery and equipment with superior technical-economic standards have a chance of success. Their standard depends in many respects on our efficient cooperation in international R&D, above all with CEMA countries. It is based on the "Comprehensive Program for R&D Progress of CEMA Member Countries to the Year 2000," adopted in Moscow in December 1985.

All sectors of the FMHTS will join in the fulfillment of high-priority tasks, i.e., electronics, comprehensive automation, nuclear engineering, development of new materials, and biotechnology. A major part of technical problems will be the focus of programs of the state plan for technological development and of the state R&D and goal-oriented programs. The main direction for the development of our branch is above all comprehensive application of all advanced production technologies which help advantageously and efficiently innovate goods and production equipment, raise labor productivity, and focus production programs on goods with long-range prospects and high technical-economic standards. Moreover, we shall concentrate on new directions in automation of operation of machinery and technological processes, and on more extensive utilization of microelectronics and robotization. It is axiomatic that additional investments in our production base will be needed for the fulfillment of those programs.

Our investment policies will observe the criterion of maximum efficiency and will be implemented so as to comply with the demand that the process of replacement be intensified, more investment funds allotted for modernization and reconstruction, the export potential expanded, imports reduced, ecological problems resolved, robotization extended, and social programs implemented.

The branch of power engineering equipment will further develop the VVER machinery for nuclear power plants, particularly the components for secondary circuits, steam turbines, and the 1000 MW turbo-alternator. The general

supplier of such technology is the Skoda syndicate in Plzen; the Vitkovice syndicate of Ostrava, Sigma of Olomouc and the Cs. Vzduchotechnicke Zavody [Czechoslovak Aerotechnical Works] in Milevsko participate in the production of equipment for nuclear power engineering. First stations with 1000 MW per unit capacity will be installed in the nuclear power plant in Temelin. The Skoda syndicate has earned an excellent reputation as the manufacturer of 500 MW capacity equipment which began operation in the Melnik II power plant, whereby the construction of thermoelectric power plants in the CSSR was for all purposes completed. However, their development will continue and their production in the future will be mainly for export. The most extensive investment unit for power engineering in the Eighty 5-Year Plan will be a 2 x 500 MW plant for the PRC. Furthermore, the expansion of the SOMA power plant in Turkey and certain other projects are planned.

Part of the Skoda syndicate's production program consists of conventional Kaplan, Francis and Pelton turbines, repumping systems and other machinery and equipment for hydroelectric plants. The quality of Czechoslovak water turbines is one of the best in the world. Because they are made of COR steel they are resistant to cavitation and have a longer service life. The water project in Gabcikovo on the Danube is now under construction and will gradually begin operation in 1990. This hydroelectric power plant will have 8 Kaplan turbines; the 9,300 mm diameter of turbine impellers in unique. One aggregate with a Czechoslovak-made hydro-alternator has 91 MW capacity. The ministry's sector for fuel generation and ore mining equipment is manufacturing and assembling at present a K 2000 wheel excavator for strip mining of coal which will compose a technological unit of the new TC 2N generation with a new model of a long-distance belt conveyor and a ZPD 800 overburden dumper.

The new generation will be characterized by its high production capacity and very dependable operation. Machinery for deep coal and ore mines is manufactured by the CKD [Ceskomoravska Kolben Danek] in Prague. At this time machinery for 1,000 m deep vertical mining is on the planning board. The highly automated 4K 5016 hoist represents a new generation.

Another essential heavy-engineering production--of transportation equipment--specializes in the manufacture of tramways, locomotives, trolleys and railroad cars. The updated models of streetcars made by the CKD Tatra in Smichov are fully thyristorized and thus their service life is longer and their power consumption reduced. One-, two- and tri-unit systems and possibly trailers will be designed and produced according to customers' requirements. To satisfy the steadily growing customers' demands, a new CKD factory is now under construction in Prague-Zlicin. The CKD in Prague manufactures also Diesel electric locomotives. The most important customer of such engines is the USSR and, to a lesser degree, Iraq, Syria, Albania, the Polish People's Republic, India and Vietnam. The USSR has received more than 5,000 units of model CME three-axle locomotives which will be reaplced by the new CME 5 eight-axle 1470 KW model which is less fuel-intensive, has a longer service life, is more dependable, and is equipped with electrodynamic brakes and electronically controlled electric transmission. The same factors will be used in innovation of other models of Diesel electric locomotives made by the CKD. The Skoda syndicate in Plzen manufactures electric locomotives

for operation on rails electrified by direct or alternating current. In recent years it has achieved excellent results; the parameters of Skoda locomotives are among the best in the world and are comparable to the French Alsthom Atlantique locomotives which are considered the top of the line in the world. The current made single- and double-flow models are furnished with automatic speed control, pulsating control and air-conditioned cabins. The innovation program will introduce deck computers for semi-automatic and later fully automatic control of the vehicle, and develop electrodynamic brakes and new high-speed undercarriages. The Skoda syndicate manufactures both Diesel electric and electric locomotives for export. Its major customer is, followed by the Bulgarian People's Republic, the Polish People's Republic, the GDR, and the Socialist Federal Republic of Yugoslavia.

Since 1982 the Skoda syndicate has manufactured the Tr 14 thyristor controlled trolley. In 1984 it began to cooperate with the Yugoslav FAS Corporation of Skoplje in the manufacture of the Skoda-Sanos hinged trolley. Last year the Tr 14 trolley was replaced by a more advanced model, the Tr 15. Its further development will render it more road-worthy and in addition reduce its energy consumption. We are planning to manufacture a unified line of trolleys whose cabin and undercarriage construction will be compatible with that of the CSSR-made municipal autobuses. The criterion of less weight, less energy consumption, expanded service life, and safer operation will be consistently observed in the production of the line made by the Ceskoslovenske Vagonky [Czechoslovak Railroad Car Manufacture], specifically, its new models of four-axle freight cars and passenger rail transport. Double decker electric vehicles for suburban transport and motor vehicles with Diesel hydraulic or Diesel electric power transmission will be manufactured.

The greatest concern of our chemical engineering industry will be the development of machinery for small-scale chemical and biotechnological production. In particular, small-scale chemical production must greatly accelerate its development which has been lagging in recent years behind the most advanced in the world. Furthermore, the development of equipment for more intensive oil treatment, higher yield of petrochemical raw materials, coal gasification, production of fertilizers, coking chemistry, desulfurization, machinery for nuclear power plants, etc, will continue. The production of machinery and equipment for rubber and plastics processing will focus on the treatment of rubber compounds, machinery for the manufacture of automobile tires, technical rubber, equipment for retreading of used tires, automatic exhaust systems, and calendering units for the treatment of plastics.

Our machine engineering will manufacture equipment for sugar factories and breweries for the food industry. The share of automation and control of technological units will be increased. In view of the importance and society-wide impact of environmental protection, the FMHTS has initiated and is no taking necessary steps to provide new types of machinery and equipment for environmental conditioning and protection.

During the Eighth 5-Year Plan and thereafter our heavy engineering will play a vital part as the manufacturer and supplier of machinery and equipment for environmental conditioning and protection. It now supplies high-capacity collectors of solid pollutants, tests new designs of sewage treatment plants, including building-block models, and has begun to deliver devices collecting aerosols in work sites, and its first appliances for catalytic reduction of nitrogen oxide.

The development of selected advanced equipment for sewage treatment plants will be completed during the Eighth 5-Year Plan and such technology will be made available. Recycling facilities for solid sewage will be designed.

Practically every department of heavy engineering production is export-oriented --both in terms of direct exports and of subdeliveries of products for final assemblies.

Over 55 percent of its exports are earmarked for the USSR. Our deliveries to the USSR consist primarily of investment units for chemical and petrochemical industry and for metallurgy. Installations for the production of urea, ammonia, ethylene, hydrogen, for catalytic reforming and hydrogenating purification will be delivered for chemical and petrochemical industry. In the sector of metallurgical engineering we shall participate in the construction of a rolling mill line in Novolipetsk and undertake the reconstruction of several rolling mills in the USSR.

As far as volume is concerned, among the most important unit deliveries are machine tools and the already mentioned equipment for food industry, locomotives, trolleys, streetcars and strip-mining machinery. A new line of products planned for delivery to the USSR consists of suburban motorized transport, retreading machinery, robots and manipulators. Of great importance to us is our involvement in selected integrated programs, such as the mining and dressing syndicate in Krivoy Rog, the Ural gas complex, and the Progress gas pipeline in which we are participating jointly with other CEMA states.

Our principal partners from the socialist countries are, next to the USSR, the GDR and the Polish People's Republic. In the coming years we shall supply in particular installations for nuclear and conventional power engineering, metallurgy, concrete plants, and machinery for food industry for those countries. Furthermore, our trade relations with the Socialist Federal Republic of Yugoslavia and the PRC are progressing very satisfactorily.

The largest investment unit thus far was the 2 x 500 MW thermo-electric power plant delivered to the PRC. We shall export to nonsocialist countries also several important, massive investment units, above all, power engineering installations made by the Skoda VHJ [economic production unit] in Plzen, chemical equipment from the Chepos VHJ in Brno, and mineral processing machinery. Investment units are among our most lucrative export commodities; their deliveries have secured Czechoslovak heavy engineering a solid place on a world level, and in some instances, among the world's best. Another interesting fact is that material deliveries amount to 80-85 percent of total exported investments, while the remaining 15-20 percent represent nonmaterial inputs, from planning through construction to final assembly.

Amont the future programs are, for instance, the construction of the Talka 200 MW power plant in the EAR and of the 2 x 105 MW Mangla hydroelectric power station in Pakistan, the expansion of the Soma power plant in Turkey by two 165 MW units, and the completion of the Stred [Center] oil refinery in Iraq, a coal gasification plant in Turkey, the Salta urea plant in Argentina, concrete factories in Ecuador, Brazil and Egypt, a brick factory in Iran, and other projects. As regards quality, new, more challenging tasks and the state of domestic and foreign relations call for intensification as well as improvement of our management system in the Eighth 5-Year Plan. The achievement of our main objectives in the Eighth 5-Year Plan depends on accelerated R&D, its higher share in the solution of vital objective issues, particularly updating of goods and production technologies for more efficient operation and conservation of labor, materials and energy. Specifications of decisions of the 17th CPCZ Congress for our ministry's intensification program are closely connected with the imperative of well organized implementation of the directives for the Eighth 5-Year Plan in the course of each year of the 1986-1990 period. This vital criterion of efficiency and quality of measures contained in our ministry's intensification program will determine the achievement of objectives assigned to heavy engineering by the 17th CPCZ Congress.

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LATIN AMERICA/AEROSPACE

SAO JOSE DOS CAMPOS VIEWED AS HUB OF HIGH TECH INDUSTRIES

Sao Paulo DADOS E IDEIAS in Portuguese Sep 86 pp 3,4,5,8,10

[Article by Solange Patricio: "Takeoff Toward the Future"]

[Text] As in the greater part of the large Brazilian cities, beginning at 1700 traffic becomes congested in Sao Jose dos Campos, 86 kilometers from the city of Sao Paulo. It is particularly so on a street that crosses Via Dutra, which along its approximately 6 kilometers alternately bears the name of Avenida dos Astronautas or Brigadeiro Faria Lima. It is along this street that the more than 6,000 employees of the Aerospace Technology Center (CTA) travel, plus 1,500 from the National Institute of Space Research (INPE), 7,000 from EMBRAER [Brazilian Aeronautics Company, Inc.], 500 from Tecnasa and nearly 4,000 from AVIBRAS [Aerospace Industry Corporation].

That veritable aeronautical route is also the reason for visits, within the framework of the so-called technological tourism, created by the prefecture of the city. There are nearly 400 manufacturers, including companies which support aerospace activities--the speciality of Sao Jose dos Campos--in the areas of electroelectronics, telecommunications, project engineering, and so forth, that last year contributed 5 percent of Brazilian exports.

It was the CTA that blazed that trail across Via Dutra, initiating the take-off of the aerospace manufacturers. Created in 1950, together with the first of its five institutes, the Technical Aeronautics Institute (ITA), the CTA confirms the legend that in the 20's, when he passed through the site, Santos Dumont forecast that a large aerial research center would be built in that area.

Reality, undoubtedly, exceeded that legendary vision. In the CTA alone--a veritable city with a hotel, supermarket, schools, restaurants, barbershops, and club--there are 800 families, which represents nearly 5,000 people. They make up part of the CTA, the ITA, the Space Activities Institute (IAE), the Industrial Coordination and Promotion Institute (IFI), the Advanced Studies Institute (IEAV) and the Institute of Research and Development (IPD). Five institutes that make up the triad of teaching, research and industry, generated by several companies in that cross street of Via Dutra and nurtured by suppliers in the region. It is a veritable web of plants that depend directly or indirectly on the CTA, developing things that range from mechanical parts to electronic digital components and systems.

External Projections

While teaching and research remain within the CTA itself, industry and markets are the external projections. "We have to develop or create industries, discover and stimulate markets," says CTA Director Air Force Brigadier Hugo de Oliveira Piva. Concrete proof of CTA influence is the creation of EMBRAER, which emerged from an aircraft division of the IPD.

AVIBRAS was created by engineers trained in the ITA, and it existed for more than 10 years, according to Brigadier Piva, exclusively from the contracts and financial and technological support provided by the CTA. Tecnasa was also created by ITA engineers, and ABC Systems itself, of the ABC Group, is installing itself in Sao Jose dos Campos to manufacture a CTA planned item, flight simulators (See article on page 20).

All the personnel of the IPD electronics division were contracted by ABC Systems, in a competition that has already become a routine. "The industries that people create conclude by creating problems for us," admits Brigadier Piva, referring to the fact that the CTA has become a great source of specialized manpower. Even secretaries are beginning to leave the CTA in the rush of contracting, which usually includes an entire team.

All in all, there is a veritable concentration of companies in Sao Jose dos Campos working in the areas of armaments and dedicated electronic systems capable of assimilating the nearly 80 students trained annually by the ITA in the areas of aeronautic engineering, electronics, aeronautic mechanics and aeronautic infrastructure engineering. Last year the CTA itself could not manage to retain any student for its own staff. In 1984, EMBRAER also had contracting problems.

However, not even because of this will the number of classes of the ITA be increased. What the institute is planning is the creation of a new computer engineering course. The chief of the ITA applied electronics department, Professor Darcy Domingues Novo, tells, however, of the difficulties in carrying the project forward. "The implantation of the course has been under study since 1982. At first the main difficulty was the human material, now, however, the project is waiting for the release of funds by the Ministry of Aeronautics."

Computer engineering would be the type of course that does not exist in the country, according to Novo. "There is a computer course in which computers for general use are studied and courses in electronics engineering in which a little is learned about computers. We want a course exclusively for computer projects dedicated primarily to aeronautics."

Over the Head of the SEI

This would undoubtedly be a great market. EMBRAER avionics packages, for example, today use a total of 43 CPU's [Central Processing Units] installed in aircraft instrument panels--the great majority of them imported. This does not cause EMBRAER any headaches but it does for the Special

Secretariat of Informatics (SEI). That is explained by the fact that aeronautics, unlike the electronics industry, has the authority for importing with exemptions on taxes on components, instruments, operating machines and computers, sometimes even going over the head of the SEI, as is admitted by IFI Director Col Euro Campos Duncan Rodrigues.

In the selection of electronic equipment that goes into the Brasilia aircraft, for example, two nationally-built pieces of equipment were tested but not approved. The reason for this was the fact that regardless of the existence of similar items in Brazil, the high costs of those products made the purchase prohibitive, it being easier and cheaper to import them in this case.

IFI inspectors go to CACEX [Foreign Trade Department] every week to check on import orders for aeronautical materials. The institute also manages the process of standardization of parts for aircraft, which are tested in CTA laboratories, and it develops relationships with industries. Today, nearly 150 companies are listed in the IFI as suppliers of aeronautical materials and products--things that fly and things that provide support for flight. In the electronic and informatics part there are the names of companies installed in Sao Jose dos Campos such as Tecnasa, ABC Systems, Datanav and ENGESA.

Professional Electronics

Operating initially in a back yard shed, and today installed in 9,000 square meters, Tecnasa was created by two engineers trained by ITA in 1962, who did not look to the aeronautics market. Their first product was an electric system for cauterization. However, at the end of the 60's, the company began to operate in the area of telecommunications, developing transmitter-receivers for the armed forces, which concluded by establishing it in the professional electronics market.

In addition to the area of telecommunications, the company is one of the only Latin American suppliers of products for radio navigation and radar, whose primary consumer is the aeronautics sector. One of the projects, for example, is the weather radar developed by the CTA and passed on to Tecnasa for the manufacturing of the transmission and reception part, and to Atanar for the digital component (terminal in color), both companies being on the IFI list of suppliers.

Indirectly, however, other companies of Sao Jose dos Campos share in that fat market. The Tecnasa division that develops and evaluates its own suppliers, uses products from Printec and Reprotec in the area of printed circuits, and from Ericsson and Ibrape (a Phillips subsidiary) in the area of components. All of them are located in the city.

A Nickel's Worth of Candy

"Printec grew because of our orders," recalls the military product sales manager of Tecnasa, Wladimir Murias de Andrade. "The Brazilian aeronautics market," explains Murias, "is very like the policy of a nickel's worth of candy. There is a limit on the money for buying everything one wants. However, this is a market opened in Brazil, since the airways plans of the states are not totally ready. However, just in Bahia and Maranhao, for example, between 30 and 40 airports are planned for each one."

Also planning the highly profitable sales the sector may represent, Datanav, created 2 years ago by ITA engineers and researchers--it also belongs to Infranav, which installs and maintains air navigational aids equipment--bases its activities in the areas of graphic and semigraphic terminals, some of them specially developed for use in radars.

The company provides the Ministry of Aeronautics with the MVR-500, an airport terminal area radar, which has already been operating at the Galeao International Airport in Rio de Janeiro since November 1985. It will begin to deliver radar image processing and viewing consoles for Sao Paulo, Rio de Janeiro and Brasilia, where they will be connected to already existing weather radars.

At the same time, Atanav is developing a graphic terminal for CAD/CAM, the only project of that line in the process of being approved by the SEI. And to penetrate deeper into that new market, a new company was created, Sisnav, together with a group of researchers from the Informatics Technological Center (CTI) of Campinas, which develops basic graphic software and applications for Atanav stations.

Former IBM Employees

Computex, also directly linked to informatics, inaugurated last year, prefers to bet on the office automation market. There are five partners: Two former ITA students, a third is an electronics engineer trained outside the city, and specializes in digital electronics; and two others, who have on their records the mark of former IBM employees. Ilso Sestari worked for 12 years in the IBM marketing department, while Mario Di Lullo worked for the company for 31 years, leaving during the first opportunity provided by Big Blue. An oddity is that the new president of IBM Brazil, Rudolf Hohn, was the replacement of Di Lullo when the latter left the directorate of the technical division in 1981.

Products developed by Computex are the expansion plates that transform the Olivetti, Facit, and, logically, IBM electronic typewriters into word processors and printers. A cheap solution (between 6,000 and 7,500 cruzados) for the user who is taking the first steps in the direction of automated offices.

Sestari and Di Lullo also have two other company franchises: Olivetti and IBM for the Paraiba Valley.

The area of informatics has other representatives such as Brascontrol, a company that in addition to making analogic controllers, signal converters and integraters for the industrial automation segment, provides, together with Unicontrol of Sao Paulo, a digital distributed control system (SDCD) with American technology--Fisher Controls. While Brascontrol takes care of hardware, Lasertech, another Sao Jose dos Campos company, manufactures carbon dioxide lasers. Its history is similar to that traveled by the high technology companies of the city. Three ITA students got together in mid 1977 and developed a 50-watt carbon dioxide laser in the ITA Physics Department. An industry became interested in the project and the group contracted the milling services of the CTA, rented a shed and created the company. "We not only graduated from the ITA, but we also built the prototype of our product there, and we contracted the services of the CTA, thus managing to produce the first industrial laser in Brazil with a 99 percent content of nationally built parts," reports the director general of Lasertech, Edgardo Gerck. He was the chief of the high power laser group of the IEAV, with which Lasertech at this time maintains an agreement for the use of its library.

Former students or researchers of ITA are found in the greater part of the industries of the region, created by them or filling the vacancies of those already existing. In EMBRAER, for example, of the 1,800 specialists who make up its technical department, nearly 700 are engineers, most of them trained by the CTA Faculty. In the IFI itself, where 249 people work, more than 60 percent are of a higher level from the personnel of the ITA. This institute has been registering on the average the loss of one professional a week, attracted to other industries by better salaries.

From Courses to Projecdts

"The large majority of professionals in the area of informatics was trained here," asserts CTA Director Brigadier Piva. The intimacy of ITA engineers with informatics may begin in courses and be completed in the projects developed by the CTA, such as the Piranha missile (air-to-air missile, which means it is launched from an aircraft for hitting another aircraft), to be made by ENGESA. The project involved the construction of a dedicated computer developed within the CTA, which was then passed on to the industry.

Especially for that area, ENGESA created the ENGESA Aerospace Missile Systems Corporation, which this year began operations in Sao Jose dos Campos. The company also has available the experience of ENGESA Vehicles, which is located in the city and which makes agricultural tractors, chassis, jeeps, equipment for oil prospecting and military materiel. It can also draw on Engetronica (another subsidiary of the group) of Sao Paulo, which makes electronic equipment and is a supplier to aviation of avionics, computerized aircraft communications and locating systems. In addition to the Piranha, ENGESA Missiles developed and makes ground-to-ground missiles (antitank), air-to-ground and antiaircraft missiles.

Projects passed on to industry, such as the Piranha, weather radar and the flight simulator (developed for the Tucano airplane by the CTA and made by ABC Systems), do not make up all the activities of the CTA.

Phoenix Project

In the area of research, the ITA has been working since last year on a project partially financed by IBM. It is the Phoenix, which has the objective of creating a program for the qualification of human resources in the areas of digital signal processing, CAD/CAM, hardware architecture, software for systems for digital processing of signals, algorisms and applications and the development of new architectures for computers and projects VLSI (integrated circuits with a large number of elements). Taking part in the Phoenix are the ITA and the IPD (both of the CTA), and the INPE and Tecnasa.

IBM sponsors the coming of foreign professors to the ITA and makes available to the institute the data of its scientific center in Brasilia. From that agreement there have already been some results, such as two master's theses: "Application of the Techniques of Multiprocessing in DSP" and "Processing of Images Using Parallel and Bit-Serial Processing Methods," in addition to an end of course project of an integrated circuit for the analysis of vibrations in aircraft.

The ITA departments of applied electronics and telecommunications are now also developing a project in the area of data processing: A network of microcomputers that may be installed initially in the CTA itself. However, there are already understandings with a local industry for the installation in its facilities.

While the engineers of the ITA are already capable of working in areas of electronics, mechanics and data processing--particularly if it pertains to aviation--the industries of Sao Jose dos Campos are having difficulties in filling vacancies at a technical level.

Attempting a solution for that problem, the CTA thought at first of creating schools, but concluded that it would be more efficient to offer technical and financial help to those already existing in the city. Thus, as of 1987, the students enrolled in the Professor Everardo Passos Technical School and in the Paraibana Valley Teaching Foundation will be able to start specializing in aviation.

"Today, the industries of the area need 2,000 technicians in the fields of electronics, data processing and aviation mechanics," estimates Colonel Duncan of the IFI. This lack of specialized personnel is being partly filled by the classes trained in the Sergeants School of the Ministry of Aeronautics. However it is not enough, very little for a city that concentrates the Brazilian aeronautics industry.

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